DISCAR

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143

# ELECTRIC RAILWAY JOURNAL

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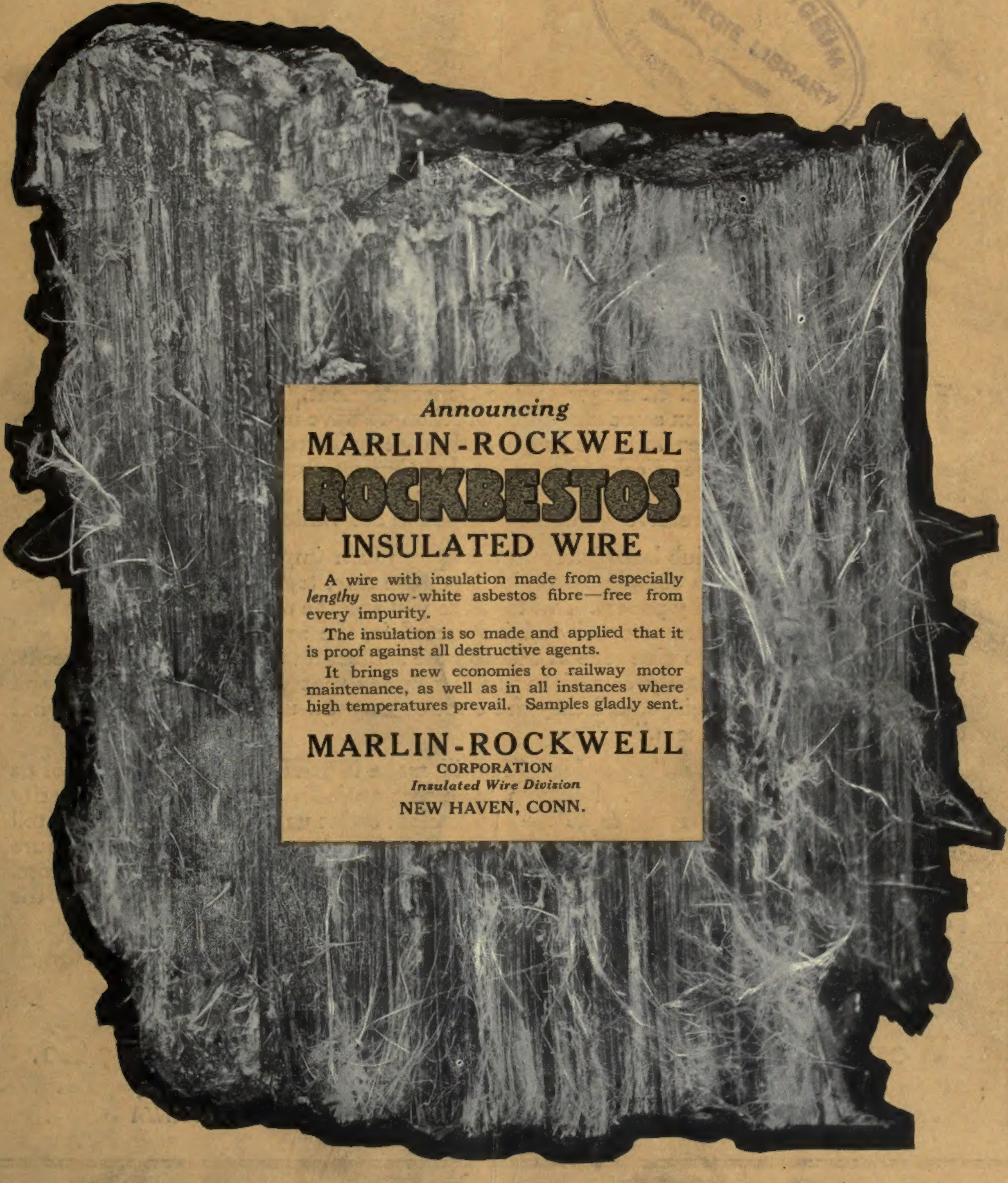


*Announcing*

MARLIN-ROCKWELL

ROCKBESTOS

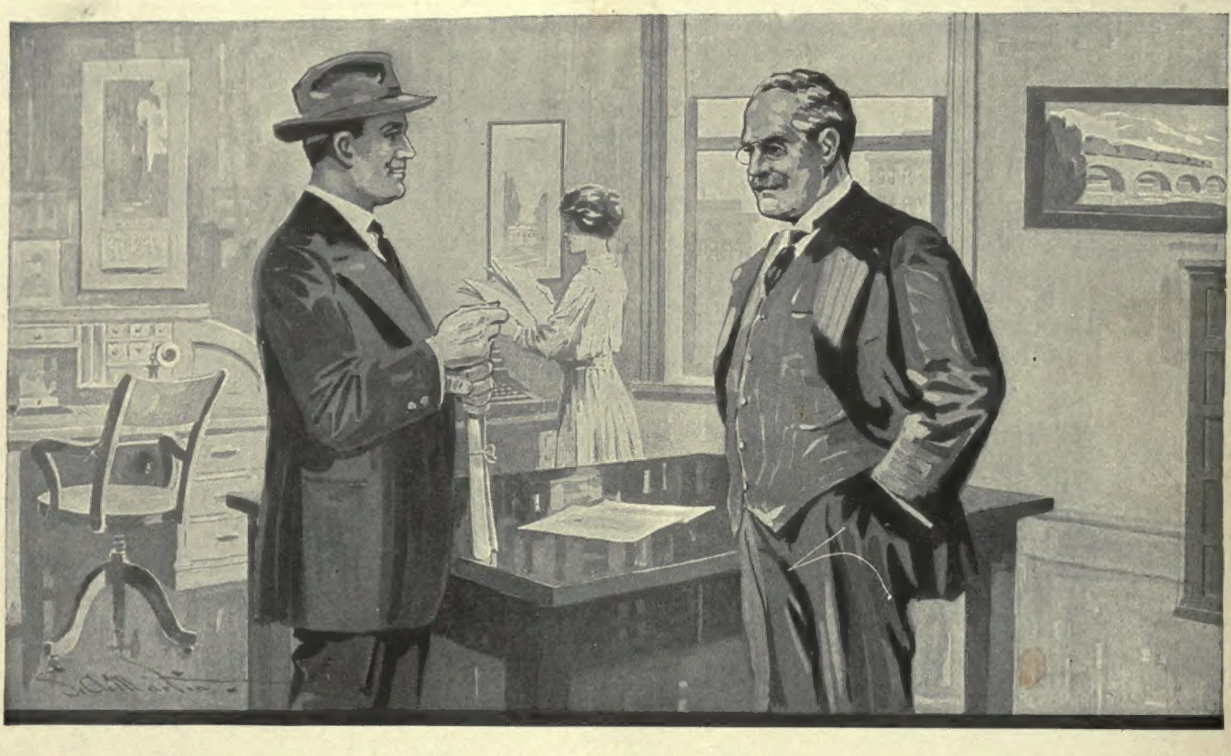
INSULATED WIRE

A wire with insulation made from especially *lengthy* snow-white asbestos fibre—free from every impurity.

The insulation is so made and applied that it is proof against all destructive agents.

It brings new economies to railway motor maintenance, as well as in all instances where high temperatures prevail. Samples gladly sent.

MARLIN-ROCKWELL
CORPORATION
*Insulated Wire Division*
NEW HAVEN, CONN.



# Preparation

"JOE," said the General Manager to the Superintendent, "we have to handle this 'safety-car' proposition somewhat different than we have in the past when we put on new cars. We must enthuse the people and properly instruct our own men. We expect the cars in about three weeks and during that time we must seize every opportunity to properly inform the public regarding their operation, and the better service and accommodations they will receive, as well as the sound economics of the Safety Car.

"I gave a talk at the club last night and was very much impressed with the interest shown. I am preparing a complete description of the cars, together with what we hope to accomplish, for the daily papers. I will look to you and the rest of our staff to see that the most reliable men are selected and instructed in the operation of the cars, and also for each one of you to give several talks on the subject during the next three weeks. We must get the idea firmly established in our minds that we are dealing with and trying to serve human beings, and they are entitled to know us and know exactly what we are trying to do for them."

"That's real dope, Boss," said Joe. "It will make it more interesting for all of us to get into the game like that. I seldom have met an individual who was not easily convinced that we were trying to do the right thing, so let us do more of that and tell it to them in large groups right along. One thing I would suggest and that is, be sure to mention in your newspaper ads. that the cars will have Westinghouse 506 motors. Everybody knows how reliable Westinghouse apparatus is, and it will convince the people that we bought the most reliable equipment."

## The Safety Car Motor No. 506.

**Westinghouse Electric & Manufacturing Co.**

*Sales Offices in*
*All Large American Cities*

W
WESTINGHOUSE ELECTRIC

*East Pittsburgh*
*PENNSYLVANIA*

*Vol.* 53, *No.* 18 New York, May 3, 1919 *Pages* 851 *to* 898

# Electric Railway Journal

H. W. BLAKE, *Editor*

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### The Zone Fare in Practice—Edinburgh, Scotland

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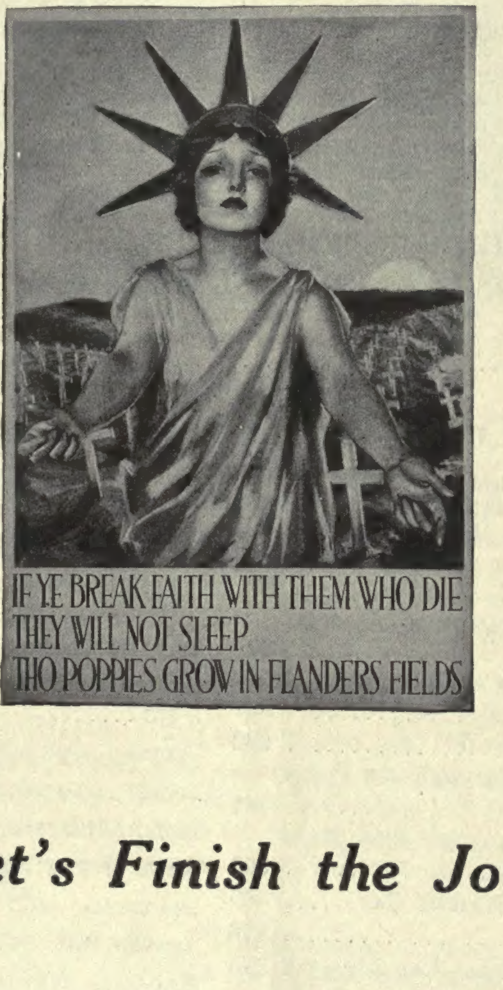
THE VICTORY LOAN

*The Fifth and Last*


IF YE BREAK FAITH WITH THEM WHO DIE
THEY WILL NOT SLEEP
THO POPPIES GROW IN FLANDERS FIELDS

*Let's Finish the Job*

**Westinghouse Traction Brake Company**

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O
Denver, Col.
Houston, Tex.
Los Angeles Cal.
TRADE MARK
Mexico City
New York, N. Y.
Pittsburgh, Pa.
San Francisco.
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.

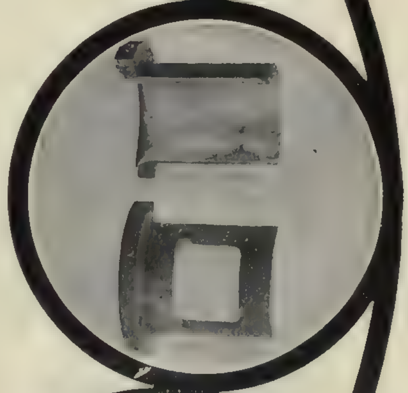
# Westinghouse

## Supply Parts maintain Westinghouse Dependability

W
WESTINGHOUSE ELECTRIC

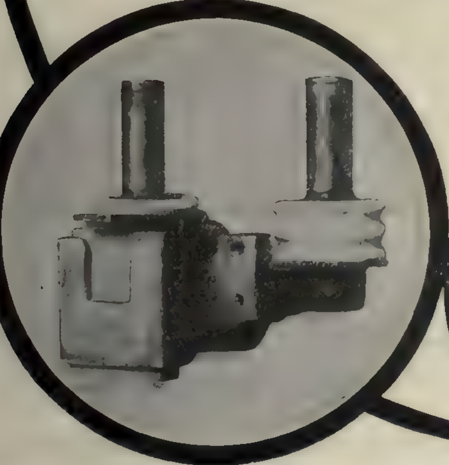
Each and every detail part carefully manufactured from the best of materials to produce a rugged unit of maximum dependability when assembled—that is the dominant idea in Westinghouse Railway Motor construction.

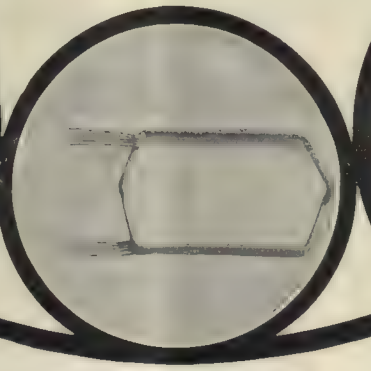
The detail parts supplied for replacement are manufactured by the same organization, and from the same high-grade materials, and are made with just as great care, and given as rigid inspection as the parts intended for the high-grade Westinghouse Railway Motors you buy complete.



**Westinghouse Electric & Manufacturing Co.**
**East Pittsburgh, Pa.**

*Sales offices in all large*
*American cities*





Vol V. No. 3

(The Official Organ of the Portland (Ore.) Railway, Light & Power Company)

# Picking on the Little Fellows

Once upon a time Henry the Ford, now High Lord of Lizzieland, was a young blacksmith in a small town entirely surrounded by Michigan. And one night a fool setting hen flew in from the village chestnut tree that stood in front of his door and located herself on a pile of scrap near the glowing forge. In due time she finished her task and there was a nice little gasoline cootie running around the place. Whereupon Henry the Ford threw a monkey-wrench at it and christened it "Flivver."

Today the entire civilized world will bear witness of the truth of this strange miracle, and the State of Oregon is going to spend $23,000,000 in the next three years to give more elbow-room to the "Flivvers." That's why we build more highways these days.

# Have Had Lots of Fun

It came to pass that all the world chuckled and smiled as Henry the Ford's little Lizzie began to cover the earth like seventeen-year locusts or a smelt run up the Sandy, but history fails to record that anybody refused to buy one if he had the price or ride in one if he had the chance.

But the funny writers and the comic papers and cartoonists had a pleasant spell while Lizzie was learning the ropes. And Lizzie had too many good points to be kidded off the map. This is not a paid advertisement.

# Same With Safety Cars

The arrival in our midst of the cute little Birney safety cars has been greeted with the same joyous and happy abandon. It has been the same in the many cities where the busy little Birneys have won their way into general popularity and where they have never been replaced after once being adopted.

---

# Safety Ca

Main Office—Boatmen

CHICAGO—Railway Exchange Bldg.

NEW YORK—City Invest. Building

# Uncle Sam Likes Them

Not only have private street railway companies without number inaugurated Birney car service, but Uncle Sam, when he was brought face to face with the greatest war the world has ever known, was obliged to step in and solve the transportation situation in a score or more of great war working industrial centers and shipyard cities.

Uncle Sam took control of every car building shop in the country. All but one or two he converted into war industries, munition plants, etc. With the others, he went into the business of building street cars to haul war-workers and shipyard employes.

As the result of the composite opinion and judgment of the best-posted experts on the subject, Uncle Sam built nothing but Birney Safety Cars, because they were the type of equipment that would best fill the bill, all things considered.

# Even the Grouches Are Gleeful

Of the total manufactured for the government our Company was allotted 25 of these cars and they have been placed in operation on two of our lines—Irvington-Jefferson and Williams Avenue. Except in the case of a small handful of persons, the car riders on these lines have accepted the new type of car with marked approval.

Patrons on other lines have asked us when we were going to be able to extend our Birney car service to their districts. It is a peculiar fact that those who have expressed themselves real peevishly about the little "tanks," have not (and there is not a single exception) based their complaint on any defect in either service or equipment or on any condition of operation that would not, with equal force, apply to any other type of car. Most of the grouches, however, have thrown the hammer good-naturedly.

# Safety Devices Overlooked

On the other hand, the objectors, conscientious or otherwise, have overlooked the specific advantages that the Birney car possesses over other types of equipment, particularly in the matter of safety. Take the complaint against the bars over the lower part of the windows that was voiced by a writer in one of the daily papers the other day. Not only the Birney car but other cars of various types in a majority of the cities of the country are equipped with such safety devices, devices that are meant to protect restless and inquisitive children from sticking their heads out of the windows; and grownups, too, for that matter, need to be protected from subjecting themselves to such foolhardy hazards.

Most of the kickers, too, overlook the distinct improvement in service through the use of the Birney car whereby we are able to give more frequent service than we could with any other kind.

*It's an old story, but ever true.*

## A Satisfied Customer Is the Best Booster

## Go the Way of Portland

Latest Convert to

## Safety—Economy—Popularity

---

# Devices Co.

Bank Bldg., ST. LOUIS

PITTSBURGH—Westinghouse Building

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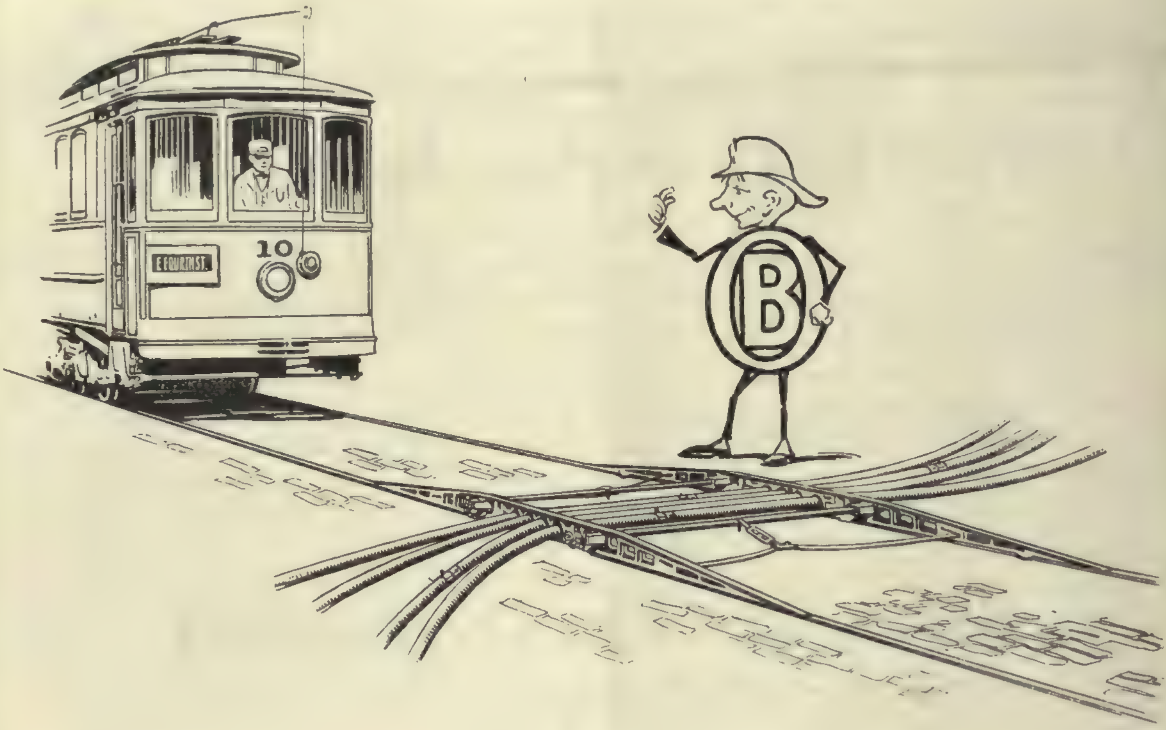
Canadian Westinghouse Co., Ltd., Hamilton, Ont.

OB PRODUCTS

*Quality First*



## Come Ahead!—In Spite of Fire Hose

O-B Hose Bridge carries the heaviest interurban car across fire hose with perfect safety to both car and hose.

Knocked-down, O-B Bridge takes little space on the trouble truck. When the emergency comes it is quickly set up and ready for cars to proceed on regular schedules over regular routes.

Fire Chiefs approve the O-B Hose Bridge. In fact, one Chief has an O-B Bridge on each of his hose trucks.

*Page* 574, *Catalog No.* 17

**The Ohio Brass Co., Mansfield, Ohio**

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles

# OB PRODUCTS

*Quality First*

Imperial Headlights used on cars of this property.

## Convincing Tribute to Imperial Headlights

Some time ago a large eastern property bought 200 Crouse-Hinds Imperial Incandescent Headlights. About a year later the road selected the same type of headlight for several hundred additional equipments—certainly a tangible and an eloquent tribute to Imperial Headlight performance.

This road uses the pressed steel W.D.S. with "Gold Ray" mirror reflectors. It fits their conditions. May be it would fit yours. But the point is this:

*Whatever your requirements, one of the Imperial Headlights is exactly right for you. Let us arrange a demonstration at our expense.*

**The Ohio Brass Company, Mansfield, Ohio**

**Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.**

# ELRECO Tubular Poles

## Show the same deflection under load applied in any direction

BECAUSE of its circular form, the Elreco Tubular Pole is the only pole that can be installed without regard to the direction or strain of load to be carried.

You know how important this feature is whenever you want a pole to take strains from several different directions. Elreco Poles simplify installation and construction engineering work.

Why should you install two poles of other shapes for corners or curves when one Elreco Tubular Pole would serve?

Elreco Tubular Poles also have much reserve strength. The extra tension from a span wire which has been struck violently by a car pole produces no permanent set. Actual service under all conditions shows that Elreco Poles excel in this regard. Catalog No. 16 contains most valuable and useful data on "Pole Engineering." Write for your copy.

**Elreco Tubular Poles combine lowest cost, lightest weight, least maintenance, greatest adaptability.**

**Electric Railway Equipment Company**

**Cincinnati, Ohio**
**New York: 30 Church Street**

# International Steel Twin Ties Under Heavy Traffic

The reputation of Steel Twin Tie Track for high class construction is national. It is based on performance.

Its smooth joints and easy riding pavement are a source of constant comfort to car riders and other users.

Its low initial cost and negligible maintenance cost make it attractive both to the large city property or the company with only a few miles of paved street track.

You cannot be sure you will obtain your hoped for results until you are fully informed about Steel Twin Tie Construction.

*There is a new folder on Steel Twin Tie Track. Have you received your copy?*

## The International Steel Tie Company

**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

Rome-Wire

# Rome Service and Electric Railway Service Requirements

WE have established a standard for Rome Wires and Cables which we shall maintain; we have the machines, the men and the materials—all, the highest grade obtainable—and the determination to keep Rome Service a standard for comparison.

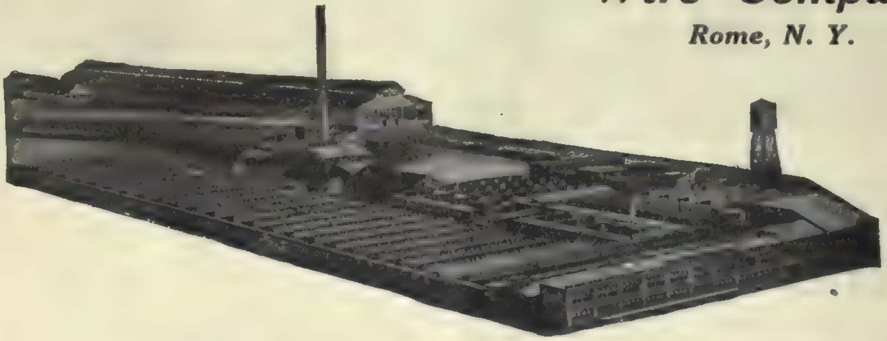
Every type of electrical wires used for railway service—magnet wire for the motors and instruments, trolley wires, feeder cables, car wire, etc., all made from bar to finished product in the same plant.

And the machines which produce Rome Wires are also made right in that same plant—that's why we know *how* they're made and *how well* they're made. Personal, executive supervision, coordination and cooperation have made the Rome Wire Organization a known quantity representing a known Quality.

Absolute accuracy of gauge, uniform high conductivity and dielectric strength and prompt delivery are standard features of Rome Service at your disposal. There's an executive waiting for your letter ready to prove it to you.

IF YE BREAK FAITH WITH THEM WHO DIE
THEY WILL NOT SLEEP,
THO POPPIES GROW IN FLANDERS FIELDS

***Rome***
***Wire Company***
***Rome, N. Y.***



***All Operations from Wire Bar to Finished Product in this Plant.***

Hot Rolled Copper and Bronze Rods.
Copper and Bronze Bare Wire, Round, Square and Rectangular, Plain and Tinned.

Copper and Bronze Trolley Wire. Round, Grooved and Figure 8.

Power Cables.

Round Edge Flat Copper Strip.
Polished Copper Piano Covering Wire.
**Magnet Wire.**
Round, Square and Rectangular.
**Rubber Insulated Wires.**
**Automobile Wires.**
Wires and Cables for Export.

**Miscellaneous Wires.**
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Canvasite Cord.
Deck Cable.
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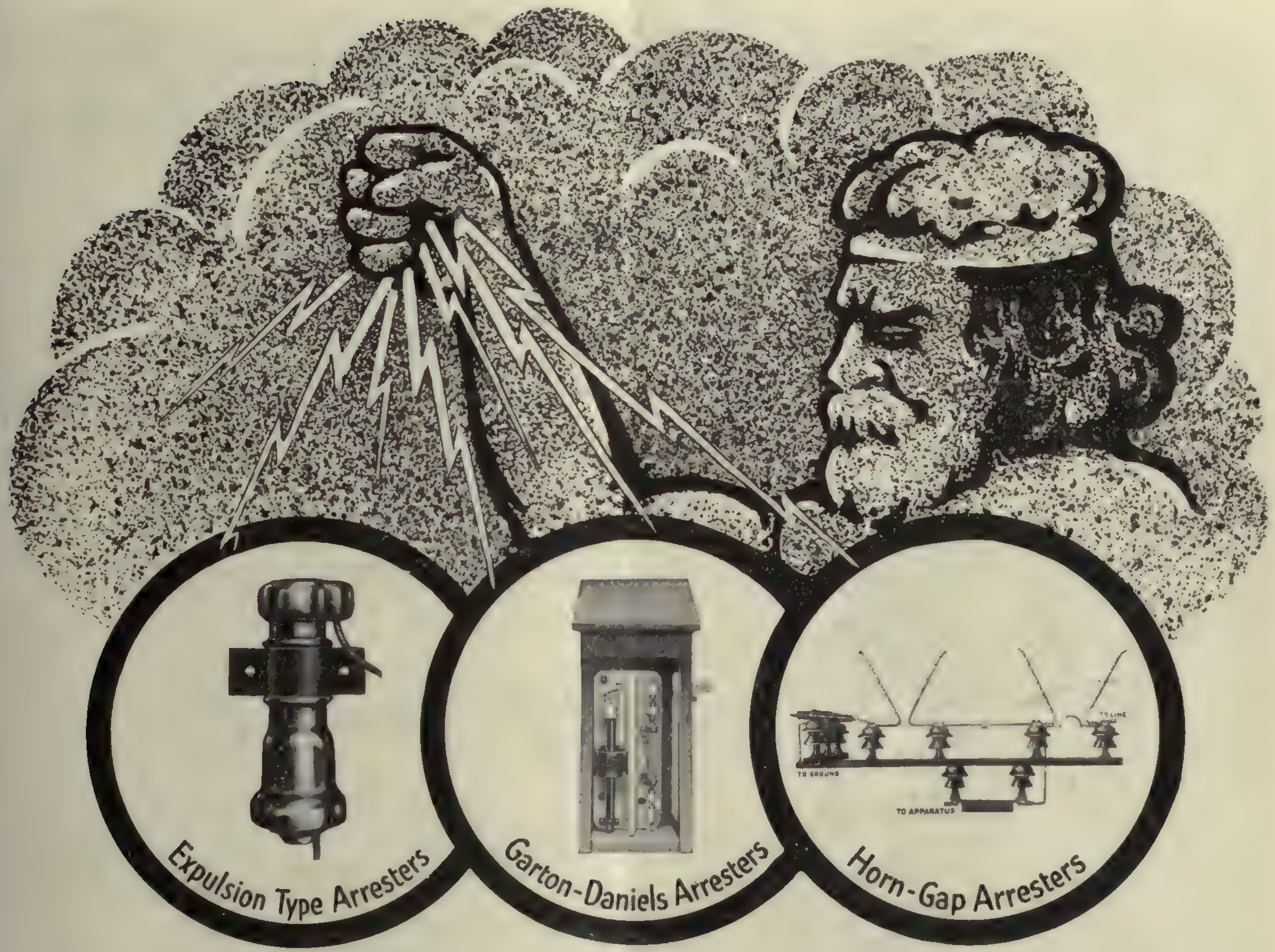
Mining Machine Cables.
Gathering Locomotive Cables.
Special Wires and Cables.

Rome-Wire



A Lightning Arrester for Every Service

Garton-Daniels Lightning Arresters have for more than a quarter century proved their efficiency and reliability in properly protecting electrical apparatus under the most severe conditions. Expulsion Type Lightning Arresters fill the demand for an inexpensive, but efficient lightning arrester, particularly designed for the protection of the average A. C. line transformer. Horn Gap Lightning Arresters are for the protection of your high voltage outdoor and certain other power and sub-station apparatus.

From these three distinctive lines of arresters you can secure lightning protection for any or all of the apparatus on your lines. Ask for a complete set of catalogs or any special information you may desire.

**ELECTRIC SERVICE SUPPLIES CO.**

*Manufacturer of Railway Material and Electrical Supplies*

**PHILADELPHIA**
**17th and Cambria Streets**

**PITTSBURGH**
**335 Oliver Building**

**NEW YORK**
**50 Church Street**

**CHICAGO**
**Monadnock Building**

To the folks back home:-
We are finishing our job.
Are you finishing yours?

Private A.E.F

On the Rhine
1919

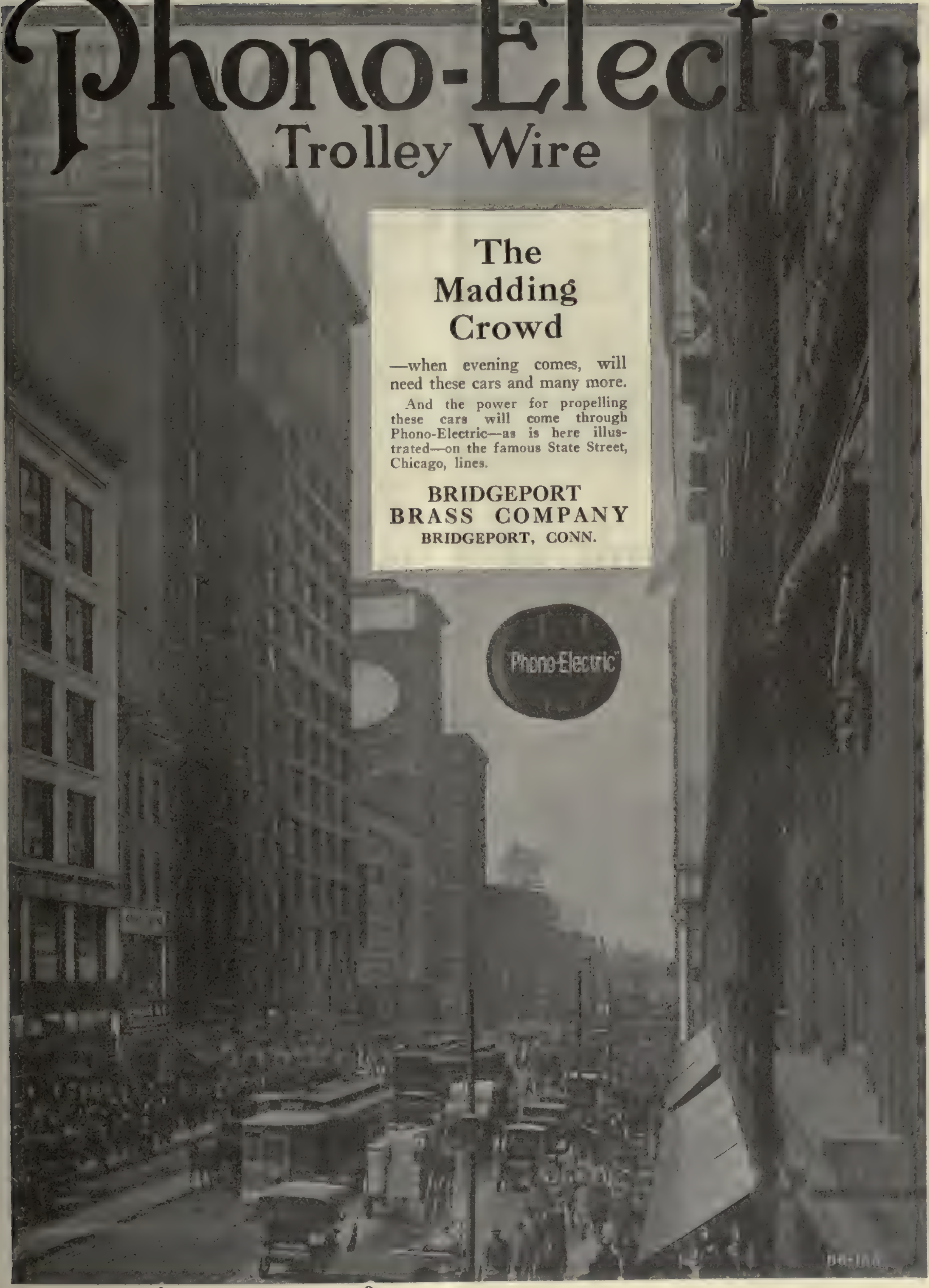
STRAIGHT FROM GERMANY
An advertisement originated and produced for the Victory Liberty Loan by members of the American Expeditionary Force.

Victory Liberty Loan

Contributed by

Trade US Mark Union Switch & Signal Co. Trade US Mark

SWISSVALE, PA.



Phono-Electric
Trolley Wire

The
Madding
Crowd

—when evening comes, will need these cars and many more.

And the power for propelling these cars will come through Phono-Electric—as is here illustrated—on the famous State Street, Chicago, lines.

BRIDGEPORT
BRASS COMPANY
BRIDGEPORT, CONN.

# Thermit at Los Angeles

## *Welds that Hold*

This scene on South Main Street between Thirtieth Place and Slauson Avenue, (3 miles) Los Angeles, is one of several important Thermit Weld installations in that busy and beautiful city.

This particular installation was made in 116 lb. girder rail of 3 ft. 6 in. gage in 1913.

While not of the later Insert Weld type, the Thermit Welds in this work are giving excellent service as evident from the absence of trouble reports. No news in such cases is good news.

The Thermit Insert type of Weld we know will give you still better service in attaining

A Truly Continuous Rail.

**METAL & THERMIT CORPORATION**

**Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.**

**120 BROADWAY, NEW YORK**

329-333 Folsom St., San Francisco
15 Emily St., Toronto, Ont.
7300 So. Chicago Ave., Chicago
1427-1429 Western Ave., Pittsburgh, Pa.
Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

## What Two Leading Authorities Say About ARMCO Iron Welding Rods

THE uniform satisfaction of ARMCO Welding Rods for both oxy-acetylene and electric welding is typically evidenced by the following comments of two prominent users.

From the standpoint of oxy-acetylene work President B. K. Smith of the American Welders Association is perhaps the best qualified man in the country to pass judgment. He states:—

> *"I have tested ARMCO (American Ingot) Welding Rods, and they proved exceptionally good. There is so little difference between your rods and genuine Norway iron that it cannot be noticed even after most severe tests as to quality and ultimate strength. I congratulate you for the success of replacing the foreign with the American product.*
>
> *"The flow of the metal is very clean and plastic, without a trace of sulphur or any other defective elements found in many special rods.*
>
> *"In testing two pieces of mild steel plates welded with your rods they broke at 60,000 pounds, which is a very good elongation showing. The acid test on the welding line showed pure, clean metal with no oxide and a uniform color with the boiler plate.*
>
> *I certainly recommend ARMCO RODS to brother welders as ideal for tank, boiler, sheet metal or any other work where best grade rods are required, and the best is none too good for any work."*

And with those interested in *electric* welding, the opinion of the Welding Department of the Newport News Shipbuilding and Dry Dock Co. should carry weight. They too are enthusiastic about ARMCO IRON Welding Rods, as may be inferred from the following comment:

> *"We are using ARMCO IRON for all our welding to our entire satisfaction and we find ARMCO works out more satisfactorily for our numerous kinds of welding than any other wire.*
>
> *"We attribute the steady arc and even flow of ARMCO to the uniformity of the product."*

Men and firms of this type do not express opinions hastily, so you may be sure that ARMCO WELDING RODS have real merit.

Making a trial costs practically nothing, so why not at least ask for our booklet "ARMCO Welding Rods."

**Carried in stock at convenient points throughout the United States and Canada.**

AMERICAN ARMCO INGOT IRON

The trade mark **ARMCO** carries the assurance that iron bearing that mark is manufactured by the American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

38

# PAGE STEEL & WIRE CO.

*Established 1883 as Page Woven Wire Fence Co.*

STEEL AND WIRE PAGE QUALITY PRODUCTS

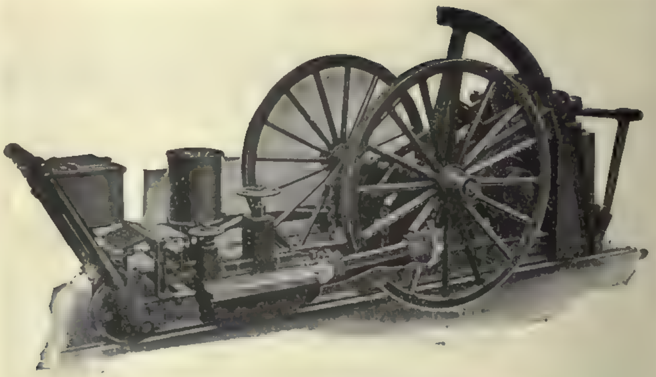
Makers of "Copperweld" Copper Clad Steel Wire; ARMCO IRON Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

*PLANTS: Monessen, Pa. and Adrian, Mich.*

**SALES OFFICES: 30 Church Street, New York**

**WESTERN REPRESENTATIVES: Steel Sales Corporation, Chicago**

Our Monessen, Pa. Plant



# *CHOOSE!*

## The Reciprocating Track Grinder

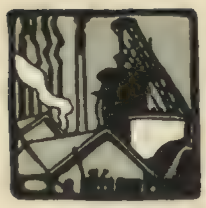
has clearly and completely shown its ability to greatly prolong the useful life and service of track.

The only alternative to the consistent use of a Track Grinder for eliminating corrugations and cupped joints is the relatively early replacement of track.

The great economy of track grinding as compared with the loss of years of track service makes the choice easy.

And that is to say nothing of the saving in the decrease of wear and tear on rolling stock and the general advantages which accompany smooth, well maintained track.

**RAILWAY TRACK-WORK COMPANY**
**30th and Walnut Streets, Philadelphia**



The S K F INDUSTRIES, INCORPORATED, announce the institution of a scientific organization for the study of anti-friction devices with the intention

—of setting on foot a thorough and scientific study of friction and the application of more improved anti-friction bearings;

—of offering to American manufacturers in every line, a bearing engineering service designed to investigate any manufacturer's bearing difficulties and offer advice as to bearings exactly adapted to his specific needs; and

—of endeavoring through the bearing knowledge developed in this manner and through its scientific investigations to be of assistance to the entire bearing industry in the improvement not only of design but also of methods of application.

WITH the conviction that American manufacturers will welcome assistance of a scientific nature in the solution of frictional difficulties, the S K F INDUSTRIES has established a service, entirely scientific in its intention, entirely divorced from the sale of any specific type, for the study of bearings in relation to manufacturing.

Heretofore, such assistance and advice have been rendered solely by bearing manufacturers as individuals. It is hoped, through concentration in one unified research, to organize the investigation of frictional problems and the giving of advice thereon in a more thorough manner, overcoming the past limitations.

The new bearing service will be both scientific and immediately practical. On the scientific side, centering in its engineering laboratories, which will be completely staffed and equipped for research of a difficult nature, it will undertake the investigation of the frictional difficulties and losses involved in the transmission of power. It will also set on foot immediate studies of the design and application of all the types of bearings now in use, making working tests and experimental tests where necessary.

On the practical side, the bearing service will place at the disposal of manufacturers, a staff of engineers who will go into the plants of any manufacturer, investigate his specific bearing difficulties and offer advice as to the type, design and application best calculated to remedy such difficulties.

It is hoped, further, through the data gathered in this plant service to manufacturers, coupled with the findings of the research studies, to establish *resources of knowledge* that will be of assistance to the entire bearing industry in the improvement both of design and manner of application.

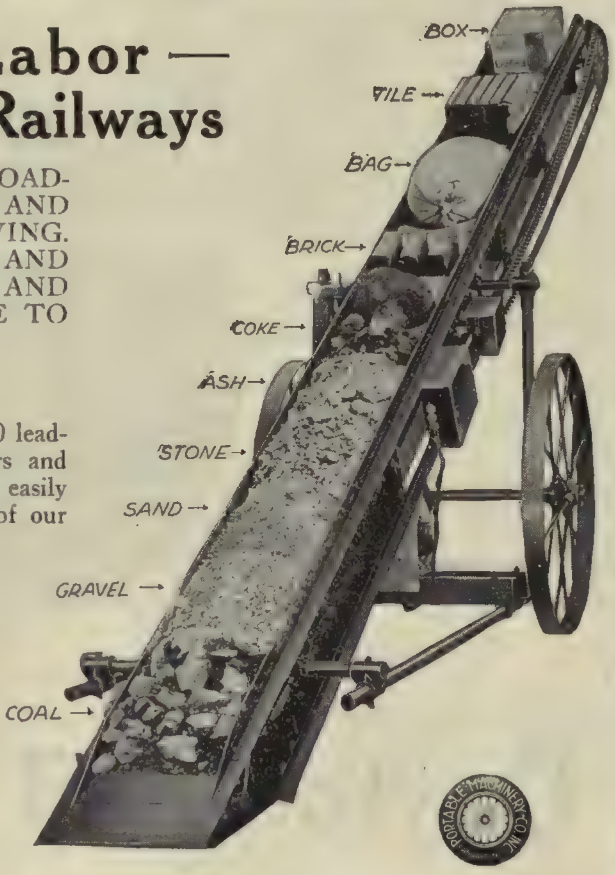
The SKF INDUSTRIES is peculiarly fitted to undertake this long-needed service to American manufacturers inasmuch as it represents a pooling of experience of two manufacturers whose past activities in the application, one of the deep-groove type of bearing, the other of the self-aligning type, have brought them into almost daily touch with every type of bearing. Combined with these is the experience of a company whose engineers' energies have been devoted solely to the manufacture of balls, a phase of the industry no less important than the completely assembled bearing itself.

To those who know of the SKF Ball Bearing Company, The Hess-Bright Manufacturing Company and the Atlas Ball Company, this massing of experience and engineering abilities, further to be re-enforced by the study of bearings from the research side, will mean advice with the impartiality of scientific effort and resources of practical knowledge not to be equalled by any other one organization.

American manufacturers are invited to avail themselves of this bearing service at any time.

# The SCOOP CONVEYOR

## SAVES Time — Labor — Money for Electric Railways



IN STORING AND RECLAIMING, IN LOADING AND UNLOADING CARS, TRUCKS AND WAGONS. IT KEEPS EQUIPMENT MOVING. ENABLES MEN TO WORK FASTER AND EASIER. ELIMINATES MUCH SHOVEL AND WHEELBARROW WORK. DOES THREE TO FIVE DAYS' WORK IN ONE.

### OVER 1000 USERS

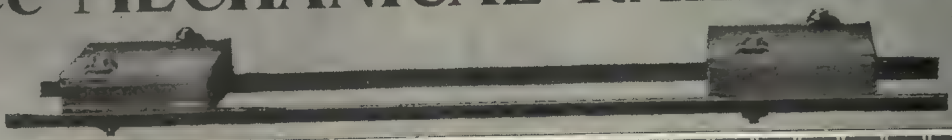
The Scoop Conveyor has been adopted by over 1000 leading American manufacturers, railways, contractors and coal dealers because it is durable, light, compact, easily moved around and low in cost. About one-half of our sales are "repeat orders."

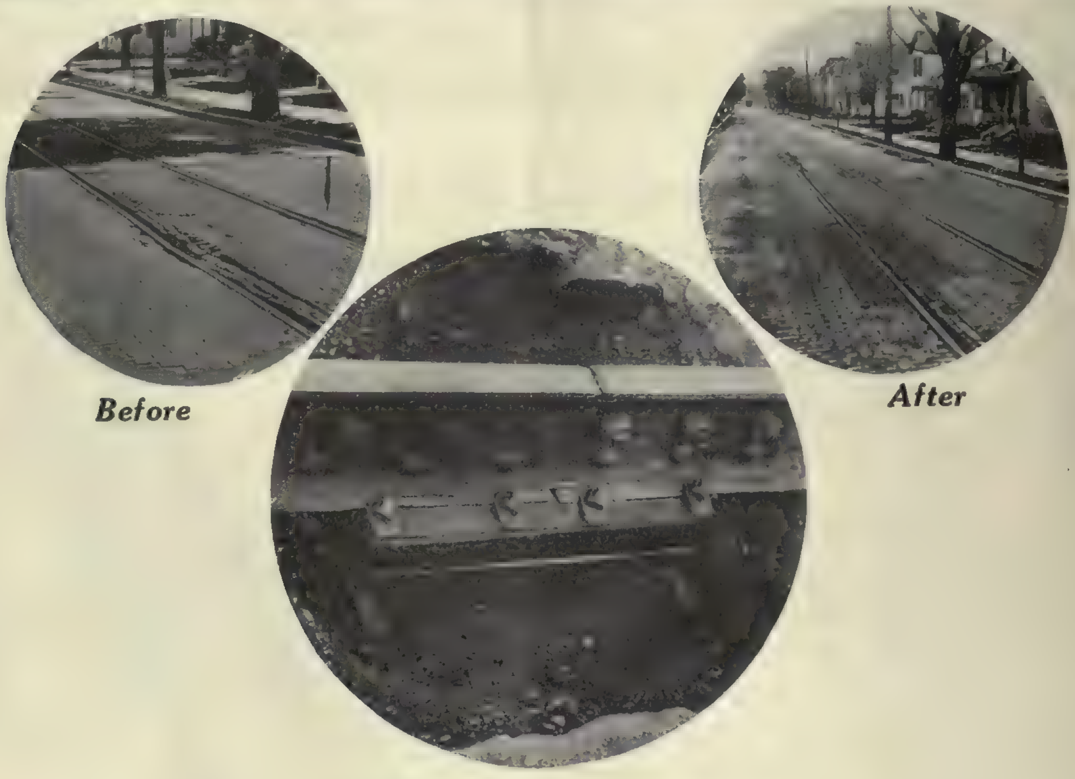
It is called "Scoop Conveyor" because the carrying belt receives its load over a scoop which can be pushed or completely buried into the material to be conveyed. This permits of scraping the material onto the carrying belt instead of lifting it by shovelfuls into the receiving hoppers fitted to ordinary portable belt conveyors and results in a saving of 50% of the labor in feeding.

*Send for literature.*

**PORTABLE MACHINERY CO., Passaic, N. J.**

# The MECHANICAL RAILWAY TIE





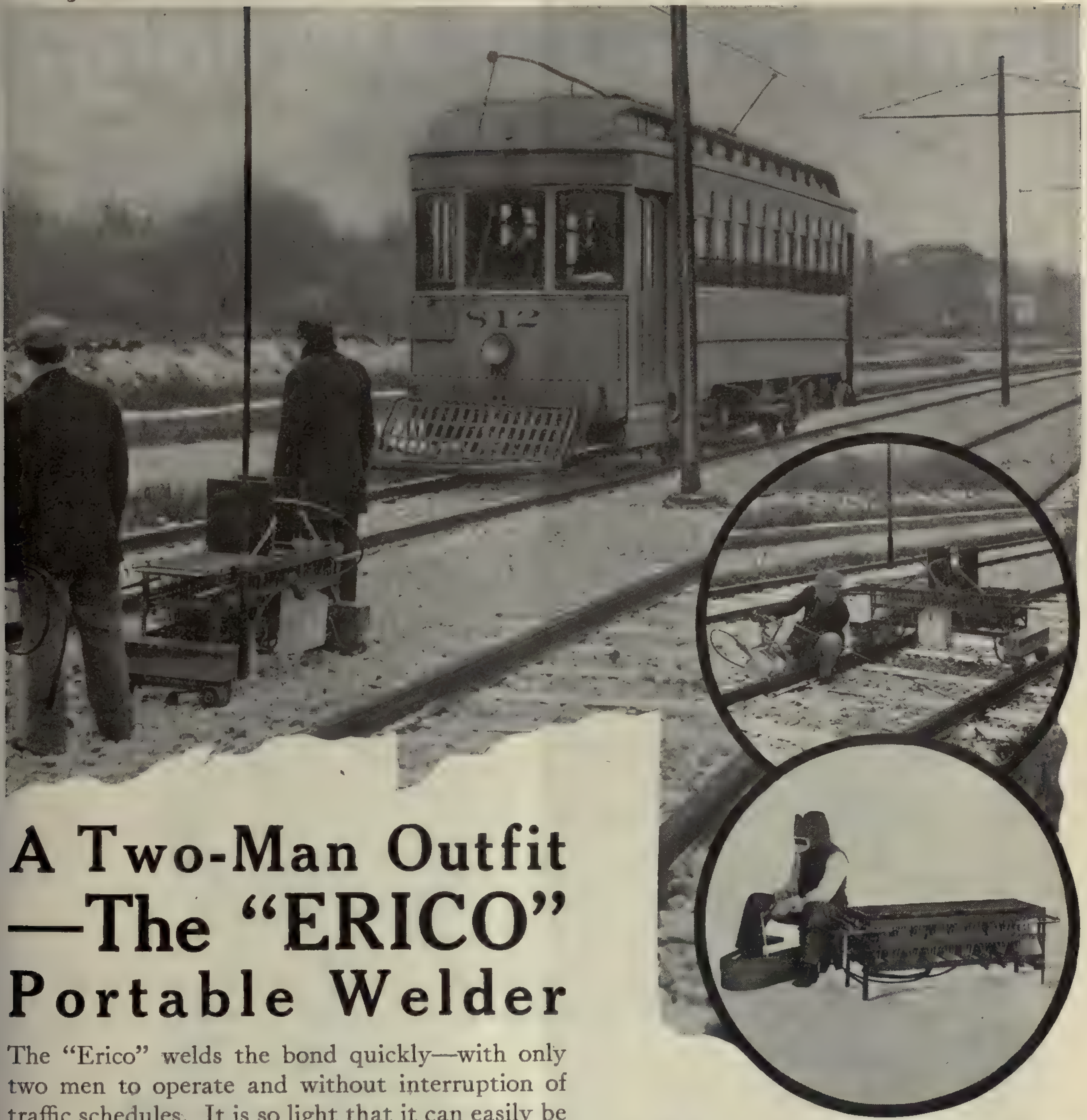
*Before* *After*

**By means of the**

# Dayton Rail Joint Booster

The upper left hand illustration shows the rails and supporting structure immediately surrounding the joint excavated. To the right you see the result a short time afterwards. The Rail Joint Booster has been clamped into place, welded, the bolts drawn up and the track jacked to its proven level—*a level from which the rails will never depart.* And traffic schedule has not been interrupted—no revenue has been lost, in these days when every penny of revenue is of such vital importance. The larger illustration shows a cross section of this Booster. Note its exceeding simplicity—yet you can easily get a clear idea of its great strength. TRY this Booster under the *very worst rail joint* in your tracks—just TRY it. Full particulars on request.

THE DAYTON MECHANICAL TIE CO.
704 Commercial Building
DAYTON, OHIO



# A Two-Man Outfit —The "ERICO" Portable Welder

The "Erico" welds the bond quickly—with only two men to operate and without interruption of traffic schedules. It is so light that it can easily be lifted off the track and the car allowed to pass without delay. The combined weight of welder and rheostat is 205 pounds.

*To add to its usefulness, the "Erico" Arc Welding Rheostat will quickly save you the price of many an article in the scrap pile by means of a quick repair.*

## The Electric Railway Improvement Co.

Cleveland, Ohio

# Indianapolis Welders

are saving time, labor and money for 90% of the street railways. Their service is almost universal. Can there be any better evidence that you are spending unnecessary dollars by neglecting to investigate Indianapolis Electric Welders?

We are at your service to help you solve the problems arising from *your* operating conditions.

## Indianapolis Switch & Frog Co.

Springfield, Ohio

*These figures tell why*

# National Pneumatic Door Engines

## *Are on Fort Worth's Safety Cars*

The Fort Worth Safety Cars run on schedules of 8 to 10 m.p.h., equaling or bettering the schedules made by their predecessors.

How can they do it when you consider that even with but seven stops per mile, the faster schedule car calls for seventy door openings and seventy door closings every hour?

On Fort Worth's basis of straight nine-hour runs, that would mean 630 openings and 630 closings per single operator.

The Fort Worth management appreciated that no man can operate a door 1260 times and not be too tired to lose *time* and to lose *fares*.

There's *one* dominant reason for the use of NATIONAL PNEUMATIC door engines in their Safety Control equipments.

No car in worth-while service can produce maximum mileage and maximum revenue without pneumatic operation of doors and steps.

*Let us apply*

## National Pneumatic Door and Step Control

*To both your present and future cars*

**NATIONAL PNEUMATIC COMPANY**
INC.

50 Church St. New York

515 Laflin St. Chicago

# IRVINGTON

# VICTORY LIBERTY LOAN

WHAT does it really mean—keeping faith with them who die? It means, first of all and obviously, a full subscription to the Victory Liberty Loan. But the man who draws only this inference gets only part of the message. Liberty is appealing to everyone, employer and employed, to keep the faith—and that appeal extends to every feature connected with or flowing out of the war. We must keep faith

IF YE BREAK FAITH WITH THEM WHO DIE
THEY WILL NOT SLEEP
THO POPPIES GROW IN FLANDERS FIELDS

**By Oversubscribing the Victory Loan;**

By doing justice to every worker and by meeting with patience and in a spirit of compromise the troublesome industrial problems ahead;

By rendering a fair day's work for a fair day's pay;

By insisting that the way of sound progress is by evolution, not revolution;

By making, each in his particular job, whatever sacrifices are necessary to bring about that reign of justice for the attainment of which our sons and brothers suffered and laid down their lives.

*From editorial in Engineering News-Record April 24, 1919.*

**IRVINGTON VARNISH & INSULATOR CO.**
**Irvington, New Jersey.**

# Gary & Interurban

## Installs ECONOMY RAILWAY METERS

because

**They meter the ENERGY, and that's what the management wants to save**

**The Dial of the ECONOMY RAILWAY METER Shows the Motorman Just How Much Energy He Uses**

The Gary & Interurban R. R. Co. is equipping its interurban cars with **Economy Railway Meters.** This road serves a densely populated industrial district adjacent to Chicago. Its equipment and operating methods are up-to-date.

**Economy Meters** were chosen for that company's power-saving work because:

**"The Watchdog of Your Power and Equipment"**

Through the use of **Economy Power-Saving Railway Meters** the purchaser will gain all the results obtainable through other checking devices, and, in addition, will obtain engineering and transportation data of high value.

This device on your cars will speedily pay for itself in the saving it effects. Meter the Energy—That's What You Want to Save.

*Let us send you our illustrated booklets.*

**Economy Electric Devices Company**
**General Sales Agent**
**Sangamo Economy Railway Meter**
**Old Colony Bldg., Chicago**

National Railway Appliance Co., New York; Burton R. Stare Co., Seattle; Ludwig Hommel & Co., Pittsburgh; L. A. Nott, San Francisco; J. G. Monahan, Los Angeles.

# A Weedy Track Made Weedless
by the
# Atlas "A" Method of Weed Killing

The Atlas "A" Method includes complete equipment for the sprinkling of Atlas "A" Weed Killer, the application of Odor Compound for cattle protection, and the entire supervision of the work by an Atlas superintendent.

In other words, the Atlas, "A" Method is a matter of complete SERVICE, the results of which are guaranteed.

When you consider that each annual treatment with Atlas "A" Chemical Weed Killer costs less than the year previous, its true economy is grasped.

For instance, the second year's treatment costs 40-50% less than the first. And remember—only one treatment a year.

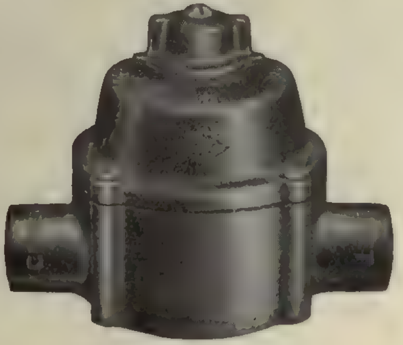
## Summer Is Almost Here

That is when traffic is heaviest and delays most costly. Don't wait. Atlas Service applied NOW will put your track in perfect condition for the summer season.

*Write for quotations and our booklet*
*"How to Keep a Clean Track."*

**CHIPMAN CHEMICAL ENGR. CO., Inc.**
95 Liberty Street, New York

# Complete Protection *for* SNAP SWITCHES



Type GSC Condulet

"Here's another new Condulet — Type GSC. It's a dandy and lets me use a snap switch on this outdoor installation.

"No dust or moisture can get inside the Condulet and the thumb knob can't be broken off. The indicating feature is preserved, too."

Type GSC is only one of a complete series of protective Condulets for snap switches. They are especially suited to out-of-door, marine, garage, refinery, and textile and flour mill installations.

*Write for new Condulet Bulletin No. 1000-I*
*You will find it valuable*

## CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NEW YORK BOSTON CHICAGO

# Both Advertiser and Reader Must Be Satisfied

Naturally you are interested ***not only*** in the INCOME from your car card space ***but also*** in the STABILTY of that income. It is because COLLIER SERVICE concerns itself so thoroughly with satisfying its clients that the railway company is assured a permanent income uninfluenced by fluctuating business conditions.

Barron G. Collier
INCORPORATED

**Candler Building**
**220 West 42nd Street, New York City**

# Put Your Service at Their Fingertips

with

# Consolidated Buzzers

Your patrons have the pleasant feeling that the command of the car is "virtually at their finger-tips" when they can signal the motorman to stop the car simply by pressing a button.

Consolidated Buzzers are the last word in simplicity and economy. The Consolidated method of obtaining current *from the overhead supply* instead of from expensive and unreliable batteries is as much an aid to better service as it is economical for you.

Consolidated Buzzers have no wearing parts, require little current to operate and do not spark at the push button.

Consolidated Buzzers are approved by the National Board of Fire Underwriters.

**Consolidated Car Heating Co.**

**Albany New York Chicago**

# Life Savers

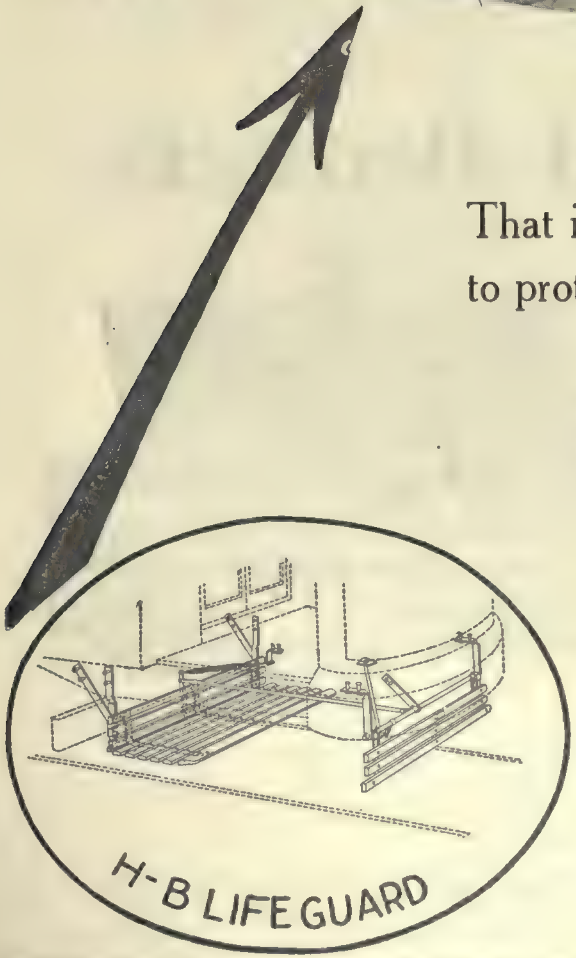
That is the function of H-B Life Guards—to protect the lives and limbs of the public.

# H-B Life Guards

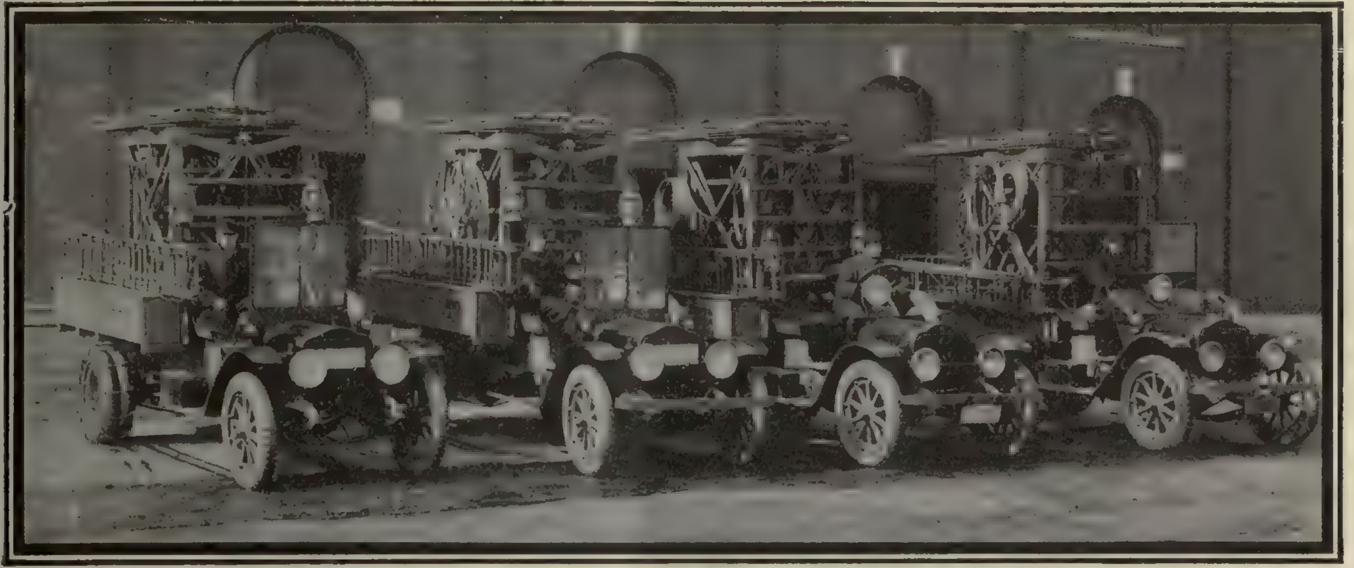
operate *automatically* and *instantly*. They form a barrier between the fallen pedestrian and the car wheels. They cannot fail because they are independent of human operation. Put them on *all* your cars and "play safe."

**The Consolidated Car Fender Co.**
**Providence, R. I.**

General Sales Agent
**Wendell & MacDuffie Co.**
**61 Broadway, N. Y.**



# White Trucks



Fleet of White Trucks owned by New York State Railways, Rochester, N. Y.

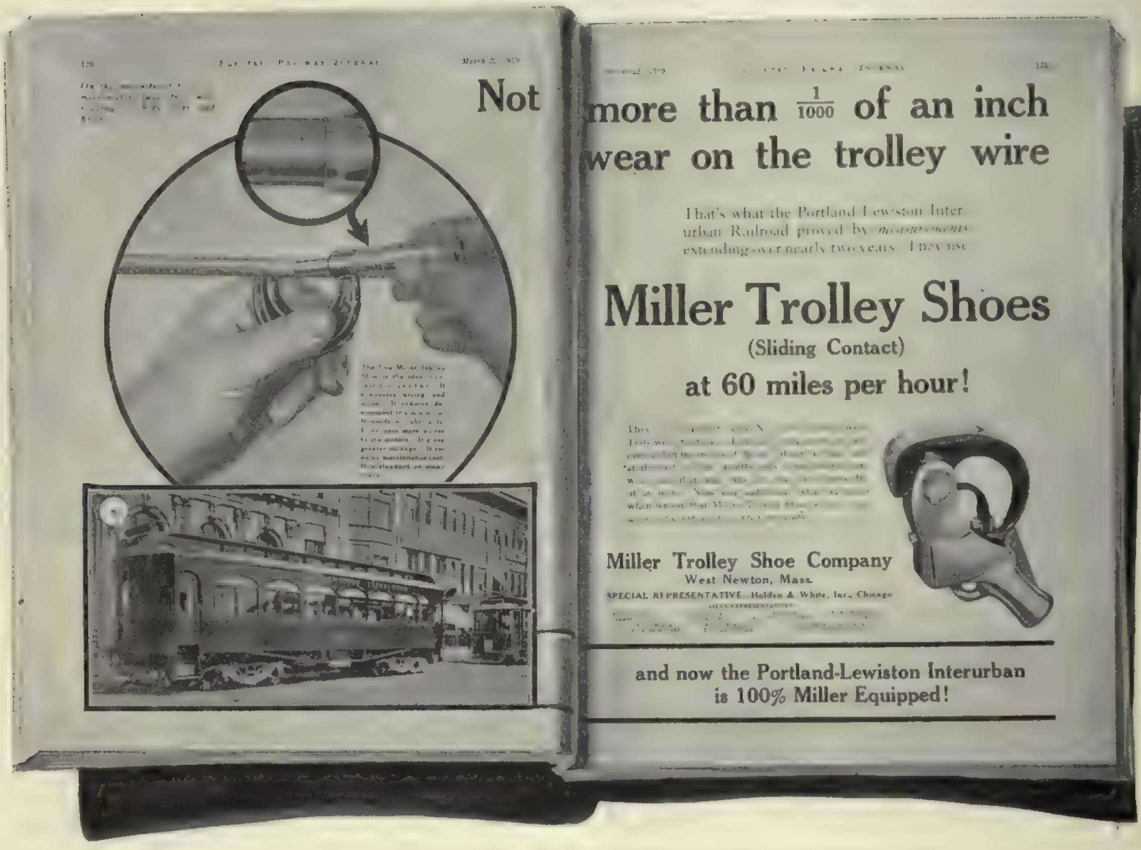
## WHITE TRUCKS PREDOMINATE IN PUBLIC UTILITY SERVICE

THERE are more White Trucks in the service of Telephone and Telegraph, Electric Railway, Gas, Light and Power Companies than trucks of any other make. This predominance is the result of unequaled records of dependable performance which White Trucks have built up through long years of service, and to the high degree of specialization which The White Company has attained in installing trucks to meet the special requirements of Public Utility Service.

The White Company sells not merely trucks. It sells efficient transportation. It *knows how* to install the kind and size of equipment for a given task, can adjust a truck installation to keep step with a business. It has knowledge gained by years of experience with many thousands of trucks in all lines of trade—*an asset of the greatest importance to the purchaser.*

THE WHITE COMPANY
CLEVELAND

# Try This Test On One of YOUR Lines



Not more than $\frac{1}{1000}$ of an inch wear on the trolley wire

That's what the Portland-Lewiston Interurban Railroad proved by measurements extending over nearly two years. They use

Miller Trolley Shoes

(Sliding Contact)

at 60 miles per hour!

Miller Trolley Shoe Company

West Newton, Mass.

SPECIAL REPRESENTATIVE Holden & White, Inc., Chicago

and now the Portland-Lewiston Interurban is 100% Miller Equipped!

*Our 2-Page Advertisement in Electric Railway Journal, March 22, 1919*

In our advertisement of March 22, 1919 we told you how the Portland-Lewiston Interurban Railroad proved by measurements that the wear on trolley wire due to sliding contact of Miller Shoes was no more than 1/1000 of an inch, during a four months' test fully equipped.

Of the dozen different points tested—all within ten inches of the ear—only three showed this slight wear. The others showed *no wear at all.*

You will never regret giving Miller Trolley Shoes a similar test on your hardest line. Just order enough Miller shoes for such a tryout.

**Miller Trolley Shoe Co.**

**West Newton, Mass.**

# "Let's Finish the Job!"

## The Obligations of Peace—

To Care for Our Soldier Boys Abroad

To Bring Our Soldiers Home Again

To See Demobilization Through

To Pay Every Dollar of War Insurance

To Give the Soldier His Pay Envelope

To Rehabilitate the Wounded Men

To Sustain Hospitals for Our Soldiers

To Pay Our War Debts - - - -

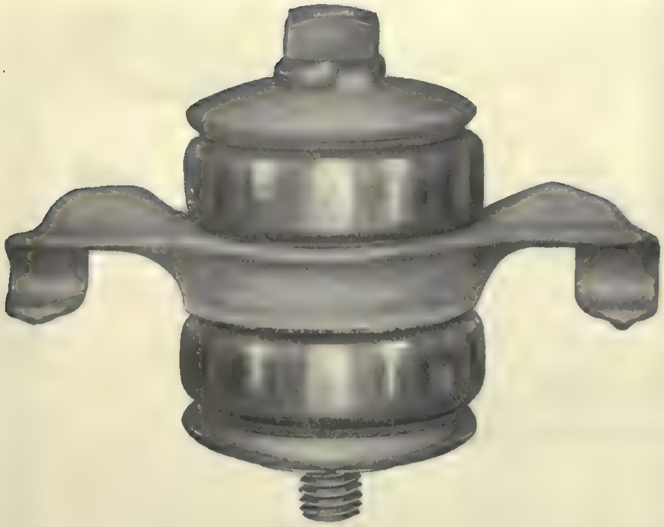
To Preserve a LASTING PEACE

The war is won, but the bills must be paid. The success of the Victory Liberty Loan is your job. You are lending, not giving your money, and your Government guarantees its return with interest.

*Buy today—cash and installments.*

Victory Liberty Loan Committee

This Space Contributed by
GALENA-SIGNAL OIL CO., FRANKLIN, PA.



# And Now a Renewable Hanger!

A few inexpensive malleable iron parts, together with some of the porcelain parts now carried in stock by every railroad for car rheostats, can be assembled quickly into the

## Form P-2 Trolley Suspension

The renewable porcelain parts of the hanger make it a very practical device for over-head construction, particularly on city service. Not only will this type far outlast any hanger having unprotected moulded compound but, when renewal is necessary, the malleable iron yoke need not be removed from the span wire. Unscrewing a single bolt permits disassembling the hanger to renew the porcelain parts. The car may be aligned in any position and then drawn tightly into place by tightening the stud bolt.

Material savings in time, labor and storage room make the Form P-2 Suspension a good proposition.

## G-E LINE MATERIAL

*Can be delivered promptly from stock*

**General Electric Company**

General Office Schenectady, N.Y.

# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

*Volume* 53 New York, Saturday, May 3, 1919 *Number* 18

## Electric Railway Gets Its Case Before Chamber of Commerce of United States

AT THE meeting of the United States Chamber of Commerce held in St. Louis this week a distinct advance was made in acquainting the commercial interests of the country with the deplorable condition of the electric railways. The presentation was not merely or principally a plea for help for an important industry suffering on account of conditions not of its own making. It was a straightforward business argument based upon the essential nature of the service rendered to the industrial and commercial life of the country.

Many of those in attendance at the convention had undoubtedly never before realized the destructive effect which the depreciation of the dollar has had upon an industry unable to advance its charges. Or if they knew about the conditions in their own towns they did not appreciate the fact that the condition is universal. Under the direction of Mr. Pierson's committee all of these facts were brought out and a national campaign was outlined by which it is hoped that some relief will be obtained.

When a railway asks only for higher fares the public may be excused sometimes for thinking the request unjustified, but when the same request is urged by interests outside of the railway as well, as being for the direct welfare of all, the application has far greater weight. We hope, therefore, that the St. Louis conference and the resolutions that it has formulated will mark an economic turning point for electric railways.

## Don't Wait for Henry Ford to Solve Your Problems

BECAUSE of the enormous amount of publicity given to Henry Ford's proposed gas-drive car, our readers will be glad to have the definite first-hand statement which appears elsewhere in this issue. From this statement based on interviews with both Mr. Ford and C. E. Sorensen, the general manager of his tractor plant, it is clear that it would be decidedly unwise for any electric railways to delay the ordering of light-weight safety cars in the hope that something very much better is to be had within a short time. As a matter of fact, Mr. Ford has not even decided whether he will build such cars commercially. A policy of waiting would be particularly futile in the case of the many electric railways which can give a greatly increased service without spending an extra dollar for power equipment and coal if they replace their present 30,000-lb. to 50,000-lb. track pounders by the 15,000-lb. anti-friction bearing safety cars. It is doubtful whether Mr. Ford would even have thought it worth while to try his hand at light-weight car design if he had not in his own experience run across so many obvious examples of power-wasting and track-ruining rolling stock. Let Mr. Ford go ahead in his praiseworthy endeavor to save fuel and metal; but instead of hanging about waiting for a miracle let the electric railway operator also get busy and pay serious attention to the splendid results which are being attained with the light-weight car already available for "more service at less cost."

## Taking a Chance With Grave Civic Dangers

THE refusal of the Illinois commission to grant an increase in fare to the Chicago Surface Lines leads one to wonder where the security holders "get off" when a distinction amounting to about $44,000,000 is drawn between valuations for city purchase and for rate-making. It is strange that the commission arbitrarily struck out several important items on which the investors had been led to expect a reasonable return.

One of these items, for instance, is $8,192,750 which was added to capital account under the ordinances for "superintendence and conducting construction." The Illinois commission has from time to time approved for the Chicago companies bond issues which included 10 per cent for this item. Such approval must have been given with the knowledge that the companies would have to pay interest on the full amount of the securities issued. The subsequent action in eliminating these allowances must be at least confusing to investors.

The commissioners figure out to their satisfaction that business is picking up so well for the Chicago Surface Lines that a return of 7 per cent may be looked for on the reduced valuation. They concede that the management is not responsible for the small receipts for certain months in 1918, and that, on the contrary, the affairs of the company "appear to have been prudently and efficiently managed." This admission will not pay a return on the large amount of capital which the commission says is not used in public service.

We might dwell on the point that several other items which make up this $44,000,000 represent money actually paid for property once used for the benefit of the car riders. If cable lines and power houses became obsolete and the management on the arbitrary demand of the city scrapped this property so that its patrons might have a more modern system, fairness would seem to indicate that the invested capital which that property represented is still entitled to a return.

But what's the use? The case has been decided and the companies must struggle along until, perhaps, another valuation is made. If it should happen that this later valuation would show the system to be worth even more than the total existing capital account, we wonder if the Illinois commissioners will be bold enough to allow a reasonable return on the new total?

At a time when commission rule is on trial and when the solvency of utility corporations is so essential to the welfare of the nation, the Illinois commission might have given heart to the industry by some such temporary measures as Commissioner Lucey suggests in his minority opinion. Even a 6-cent fare would have given courage to capital while a thorough valuation of the properties was being made. Such emergency relief "would at least have justified itself as an insurance against possible grave civic and financial dangers," as one of the leading Chicago newspapers put it.

## High Prices Will Remain—Face the Facts and Act

STOP looking backward, and do business! Such is the vital message of the National Prosperity Campaign to the American business man—a message which undoubtedly signalizes the best leadership of the day. This campaign, to which we have referred several times, is of national significance and essentiality, and short-sighted will be the business man who does not support it to his last ounce of energy.

Electric railways should not hesitate to join enthusiastically in the campaign, for not only does it possess among its leaders a prominent electric railway man, P. H. Gadsden, but also it has a basic principle—regarding the prolonged maintenance of the present high-price level—which is of peculiar interest to such carriers. The argument often made against fare increases has been that higher costs were only temporary and that security holders could with justice be compelled to bear present losses. This argument has been repeated with added emphasis since the armistice was signed, many seeming to believe that the cessation of hostilities should mean a sudden decline in prices to the pre-war level.

Regulatory bodies do not go so far astray in their economic thinking as does the general public, but even the commissions are inclined to be too hopeful regarding lower prices. For example, the Wisconsin Railroad Commission in recently denying a fare increase in Milwaukee stated that the last six months of 1918 included the period of highest operating costs and that reductions rather than further increases were likely to come. Similarly the Illinois commission in the Chicago Surface Lines case has just expressed the opinion that estimates of material costs "will not have that degree of permanency which entitles them to be considered as fixed elements in adjusting rates." But such predictions, even if accepted without qualification, should not suffice in rate cases. The time element should be more carefully considered.

*When* will the general price level drop near to the pre-war mark? If this drop is a matter of a few months, the electric railway industry may survive without increased revenues—its crippled capacity for service and its diminished credit being, of course, negligible factors. The public may be too short-sighted to see, and commissions too optimistic to seek to prevent, such impairment of the industry, but neither the public nor the commissions can be so utterly stupid as to fail to realize that inadequate revenues and continued high prices for fifteen, twenty or more years would mean absolute ruin for the electric railway industry. Yet such an elapsed time for the continuance of the present high-price level is exactly what is in the mind of practically all leading economists.

The danger which they and the leaders of the National Prosperity Campaign would have every commissioner, railway operator and business man avoid is false reasoning from the particular to the general. Since the signing of the armistice the cost of living for American wage earners has declined 2.8 per cent; copper has dropped to the pre-war level, and pig lead is only 17 per cent above it. These, however, are reactions due to special causes, and, as pointed out elsewhere in this issue by Mr. Holden, the general course of prices since November bears out the theory that a new price level has been established which will not fall in the near future. The scarcity demand for commodities, the high cost of labor and the enormous inflation in the currency supply have operated to cause price increases similar to those during the Civil War. It was thirteen years after this war that prices returned near the pre-war level, and the differences between that situation and the present one are considered by reputable authorities to be such as will increase rather than lower the number of years required for price deflation.

The conclusion, therefore, is twofold. First, the commissions must face economic facts and substitute for a reverence of former prices a practical fare reckoning based on present costs. They must not sacrifice a vital industry to a baseless hope. Second, the electric railways, as rapidly as they are enabled to do so, should go ahead full speed with construction and production. Unified enthusiastic activity should be the watchword of all business.

## High Price of Labor Should Stimulate the Use of Labor-Saving Devices

THERE are many devices in use and coming into use on electric railways that have demonstrated their ability to save labor. The present is the time for putting these devices to even more extended use than before, for labor is expensive and is going to remain so for a considerable time to come. It is therefore useless to defer the purchase of needed equipment in the hope that this equipment is going to be cheaper soon, because it is largely the high cost of labor that keeps up the cost of equipment, and by the time labor comes down in price the equipment will have more than paid for itself, if wisely selected.

These conditions pertain with respect to standard equipment, and even more so with regard to apparatus still in process of development. Take for example the automatic substation. While this has now reached a fair degree of standardization, still users are constantly devising improvements which are, when worthy of general adoption, incorporated by the manufacturers. This constant condition of improvement will naturally have a tendency to keep up the cost. A more general adoption of the automatic control principle will operate to bring down the price because parts can be manufactured in larger quantities. Of course the chief factor in keeping up the price of automatic substations, like everything else, is the high cost of labor. On the other hand labor is a large item of expense in manually-operated railway substations and will always remain so. Hence, the higher the cost of labor the more opportunity there is for the automatic substation to save operating costs. This explains why automatic control has made such satisfactory headway even under the stress of war-time opposition.

## British Electrification as a National Project

THE creation of a Ministry of Ways and Communications for the United Kingdom is one of those bold departures and conceptions accelerated by the Great War and characteristic of Britain's new spirit of enterprise. Indeed, it is planned as one of the great steps toward making up for some of the dreadful wastage of the past four and one-half years. Duplication and unnecessary services are to be eliminated in one place and better means of transport and communication are to be introduced into other places. As a political experiment its success, apparently, will depend upon finding a succession of despots who are both benevolent and able, for the bill gives unprecedented power to the new minister.

However it is not with the political aspects of this change that we are now concerned, but with the effect of this concentration of transport control upon the fortunes of British steam railroad electrification. To all appearances, this effect will be more than good. Sir Eric Geddes, the proposed minister, is a friend of electrification. The bill drawn under his direction calls for a truly grandiose scheme of electric generation, distribution and use. In fact, if one were to judge from the popular newspapers, the electric foot-warmer will soon displace the habit of getting one's pre-breakfast tea in bed. In all seriousness, we would rather expect too little than too much from a greatly enhanced use of electricity, whether in transportation or other fields. It is hardly conceivable that all of the power stations and distribution systems are so inefficient as compared with the coming super-stations that they need be consigned to the scrap heap forthwith. In addition to the existing large turbine plants, it will no doubt be found desirable to tie in with a number of older ones that will be good for stand-by service for some years to come. It is indeed a ravishing dream to see a chain of stations, say with units of 50,000 kw., running within a radius of 30 miles everything from a main-line train to a cheese-paring machine; but it is not likely to prove so attractive when it is found that the difference in pounds of coal per kilowatt-hour efficiency will not cover the additional fixed charges. In brief, engineering must go hand in hand with common sense.

These thoughts on power generation and transmission are closely related to the most ticklish question of all—what system should be used? There will be delay enough in the temporary or permanent discarding of the plans of individual railroads without wasting years in argument as to what system should be universal, if so chimerical an idea is contemplated. Electrification cannot begin too soon or under more favorable conditions because, as the result of the war, considerable reconstruction of the permanent way is necessary in any event. It would be deplorable if the partisans for different systems were to repeat our own errors, all the more so as there is no longer any question about the reliability of any of the systems over which so many arguments have been fought.

At a distance of 3000 miles it may seem presumptuous to offer counsel. It is true that we lack all the facts, but we are at least as non-partisan as the man who said: "I'm neutral. I don't care who licks Germany, so long as she's licked." We don't care what system, or systems, are used to electrify Britain's railroads, so long as they are electrified. And it is this disinterestedness, based upon our experiences, that leads us to say: "Don't try to electrify everything to one pattern. There is a degree of bigness beyond which standardization can be a curse instead of a blessing. Do not fear to use one system for your great suburban areas, a second for your long main lines, a third for your long heavy grades. Perhaps you will find that, today, high-tension direct current meets a wider range of conditions than any other. Do not, therefore, despise the alternating-current systems whose pioneering made the raising of direct-current voltage imperative if it was to stay in the field. As electrical engineers and business men who have been given a great responsibility, you will ask but two questions: Is electrification of this particular track going to pay, and if it is, what kind of electrification will do the work at the lowest over-all cost?"

## Supreme Court Rather Minimizes the Burdens of War-Time Operation

THE ruling of the United States Supreme Court in the Columbus case, noted in last week's issue, is a disheartening blow to electric railways in Ohio which had hoped for judicial relief from war burdens. The decision, however, is of local application on account of the peculiar limitations of governmental powers in that State.

The Columbus Railway, Power & Light Company, confronted with seemingly impossible burdens of operating costs, desired to surrender its franchises because of the inadequacy of the stipulated fare. The court holds, however, that the contracts between the company and the city became mutually binding for the ordinance period notwithstanding the unforeseen difficulties which arose. The court maintained that the war and the resulting higher costs of operation did not constitute the *vis major* which judges frequently recognize as excusing non-performance because of impossibility. It admitted that the case involved a hard bargain but averred that "equity does not relieve from hard bargains simply because they are such."

Many may doubt that the contracting parties should reasonably be expected to have foreseen the difficulties arising out of operation under war conditions with a fixed fare. The court has ruled, however, and the company must seek another way out. Under the Ohio Constitution the jurisdiction of the Public Utilities Commission is limited by home-rule provisions, but the city of Columbus should lose no time in redrafting its contract with the company in accordance with far-sighted and constructive principles.

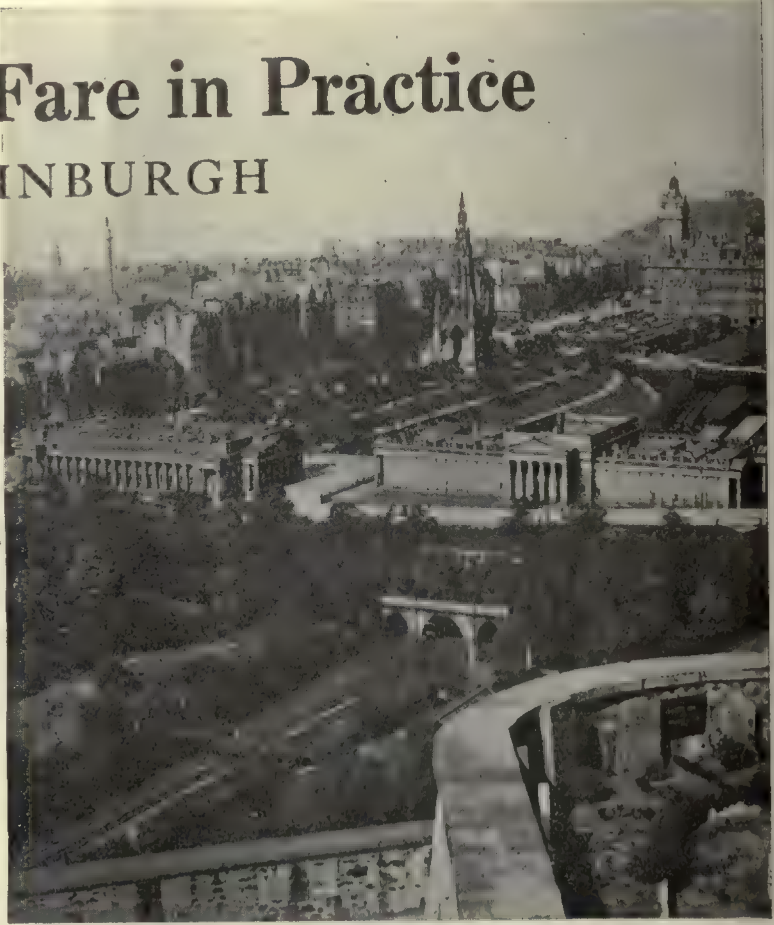
The decision, as regards its general applicability, concerns merely the right of surrender of the direct parties to a franchise, and not the right of the state to intervene. It in no way affects the principle, which has been enunciated by the United States Supreme Court in a number of cases, that rate-making, unless unmistakably given away, is part of the police power of the state to be exercised through the Legislature or its agent. In seven states the question of legislative or commission jurisdiction over franchise rates has not been determined. In the other cases of commission control, except in Ohio, New York, Michigan, Georgia, Colorado and Alabama, where the regulatory laws are defective or constitutional difficulties regarding home-rule are said to arise, the state can intervene to alter a franchise rate. The plight of the Columbus company is surely eloquent evidence of the wrongs that may ensue from an abridgement or imperfect use of the police power.

# The Zone Fare in Practice

## EDINBURGH

**Edinburgh Is the Only British City that Can Vie with New York in Capacity of Tenements, These Buildings Being a Relic of the Time When the Ancient Capital of Scotland Was a Citadel Town—Delay in Extending the Suburbs in Modern Times Is Due Largely to the Limitations of the Cable System, which Shortly Will Be Electrified**

BY WALTER JACKSON



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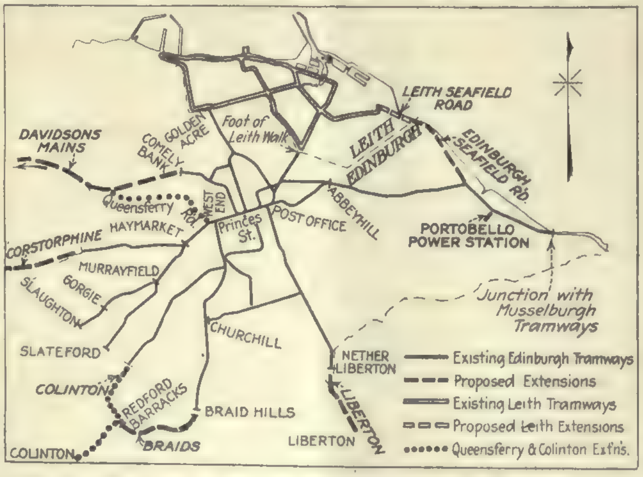
EDINBURGH, LOOKING TOWARD PRINCE'S STREET AND SCOTT MONUMENT

ALMOST from the Middle Ages Edinburgh, so famous for its beautiful location, has had a less desirable degree of note because of its tall tenements, the highest and largest in the United Kingdom. The origin of these tenements is assignable to two chief influences: (1) The growth of the old-time city on the slopes and top of the hill on which the citadel or castle of defense was, and still is, located; (2) the imitation of the French "flats" idea at a time when Scotland and France were closely associated. At first many of the houses clustered between the Castle and Holyrood Palace were the homes of the nobility, and to this day some of the structures bear the ancient coats-of-arms. With the passing of a separate royal court, the original tenants gradually drifted away until the mansions of the wealthy had degenerated to the hovels of the poor.

It would be easy to find in the novels of Sir Walter Scott—almost the patron saint of Edinburgh—many an interesting description of the housing conditions in the city. It is doubtful, however, that anything more typical of its dwellings in the eighteenth century has been written than the following quotation from *Humphrey Clinker* by Tobias Smollett:

> The water is brought in leaden pipes from a mountain in the neighborhood to a cistern on the castle hill, whence it is distributed to public conduits in different parts of the city. From these it is carried in barrels on the backs of male and female porters up two, three, four, five, six, seven and eight pairs of stairs for the use of particular families.
>
> Every story is a complete house occupied by a separate family, and the stairway being common to all is generally left in a very filthy condition.

Plenty of these structures are still standing, as will appear from the illustration on page 857 of a group of seven-story tenements on High Street. But it is no longer necessary for either male or female porters to carry water up the stairs. Nor are the stairways in a filthy condition, for they are now electrically lighted by the municipality, which also imposes a special tax for their periodical cleaning by an outside caretaker.



MAP OF EDINBURGH CORPORATION TRAMWAYS AND PROPOSED EXTENSIONS UNDER ELECTRIFICATION PLAN

### FLAT-LIVING HABIT LONG INGRAINED

According to J. A. Williamson, city architect, Edinburgh, the old habit of living in flats became so ingrained that it has continued down to the present day. The narrow closes and wynds (alleys) of olden times had no place in the new scheme, but four and five-story buildings *a la Glasgow* were still the customary thing. A specimen of these styles, as built in the Gorgie section of Edinburgh, is reproduced on page 857.

In a discussion on Jan. 8, 1919, Mr. Williamson said that for four and one-half years not one house for workingmen had been built because of the scarcity of labor and the high cost of material due to the war. Present labor and material conditions were such that private enterprise would not touch the building business except for costly private homes. Asked as to prewar conditions, he said that it would have been cheaper to live in the suburbs, making all due allowance for cost of transit, if the people could have been tempted to move by the provision of comfortable houses not too far out.

Unfortunately, however, little had been done in that direction. Years ago some model cottages had been put up by Mr. Cox, the gelatin manufacturer. A workmen's co-operative building society had also built some two-flat houses with separate entrances and located twenty-nine to the acre. The efforts of the municipal government itself dur- the past decades had centered on relieving the old buildings of their worst features.

The city, Mr. Williamson continued, now owns 130 acres in the Gorgie district, which is now used chiefly for public markets but has ample space available for other purposes. It is intended to set aside a portion for manufacturing purposes with direct connection to steam railroad trackage and to use an area of about 50 acres on which to build fourteen two-flat houses to the acre in groups of four with gardens and other open spaces. A playground of 3 acres would separate the residential section from the markets and slaughterhouses. Diagrams relative to the proposed housing are presented on page 858.

GENERAL POST OFFICE AND WATERLOO PLACE, EDINBURGH

Another site of 50 acres is in contemplation on the north side, negotiations with the owners now being under way. On the whole, the housing scheme is developing so extensively that the city is in negotiation for ground equivalent for the provision of about 3500 houses, the intention being to aim at about 10,000 altogether in the immediate future. This will involve about £6,000,000 of capital expenditure.

Land is acquired usually on the basis of a perpetual annual rental termed "feu," a survival of fuedal times. Land leased for farming purposes carries a very low rental compared with that for the same land to be improved with buildings. To prevent holders of such lands from charging a rental that would give them this unearned increment, Scottish municipalities are seeking the enactment of a law which would enable them to acquire existing open land without stating the purpose to which they intend to put it. Such freedom would be the first step in erecting houses at a total cost that would permit a reasonable return on the investment.

### DIFFERENTIAL FARES HAVE NOT HINDERED SUBURBAN DEVELOPMENT

According to circulars of the Scottish Local Government Board, quoted by Mr. Williamson, it is agreed by the government to limit the expenditure on the part of the local authorities to 1d. per pound of the local taxes, the State making up the rest of the annual loss on housing schemes. In Edinburgh the 1d. in the pound produces on the assessable value of the city about £12,000 to £13,000, so that Edinburgh would be required to build houses up to this limit before government aid was available at all. The government plan provides that not more than twelve houses shall be placed on an acre and that each shall have at least three rooms.

The matter of housing has been discussed in the foregoing wealth of detail to bring out the fact that there are other factors than rate of fare or amount of transportation to cause or continue congestion. In the case of Edinburgh, there are grounds for believing that the adoption of a cable system and failure to electrify it years ago have had a discouraging influence on building development. Nevertheless, the majority of the Council, judging by their recent (January, 1919) rejection of the universal fare plan of Councillor MacLaren, as mentioned later, do not hold the system of differential fares responsible to any tangible degree.

The relations of the city with the present operating company, the Edinburgh & District Tramways, have not been particularly cordial during the past decade or so. The company knew that the twenty-one-year lease, which expires on June 30, 1919, would not be renewed because of dissatisfaction with the service. Hence the property has been allowed to deteriorate. This is the case not only with the cars, which are owned by the company, but also with the right-of-way and track, which are owned by the city. Because of the latter circumstance, arbitration proceedings are being held to fix the extent of the reimbursement to which the city is entitled when the new municipal management, the Edinburgh Corporation Tramways, takes over the property on July 1. Aside from the conditions arising out of the franchise termination, the war made it impossible to get new cables, so that in some instances lines had to be shut down for a week at a time while repairs were being made.

All in all, Edinburgh with a population of 300,000 and an area of 19 square miles had only 48 miles of single track or 25¾ miles of line. All is cable except

To R. STUART PILCHER has come the unique opportunity of constructing and operating a street railway system *de novo* in the year 1919! As the reasons for the supersession of Edinburgh's antiquated cable system by electric cars and gas buses are set forth in the accompanying article, one need mention only why Mr. Pilcher is exceptionally qualified to deliver the goods. As general manager of the Aberdeen Corporation Tramways, with which he was connected for twelve years, he introduced a number of car comforts that are associated more with American than British practice. As an operator, he had great success with a combination of short-distance stage and full-route universal fares that appears well suited for towns of medium size; and he demonstrated that the prepayment system is by no means impracticable where more than one class of fare is charged. His memorandum on fares, quoted in the article, is ample evidence that he is a keen observer of American practices and tendencies. Mr. Pilcher visited the United States and Canada shortly before the war. One other direction in which he has been a leader is the use of power-checking instruments on cars, Aberdeen having been one of the first to install them as early as 1908. All in all, one may rightly expect that the Edinburgh Corporation Tramways within the next two or three years will become the embodiment of the best practices in the inter-operation of tramways and buses.

for 2 miles of electric overhead construction built, between Ardmillanter and Slateford, because of the refusal of the city to permit any further cable extensions. At best, the cable system had reached the limit of its usefulness.

With all the handicaps imposed upon transportation, it is remarkable that the tramways should have carried 70,687,148 passengers with 6,139,368 car-miles or eleven and one-half passengers per car-mile for the year ended Dec. 31, 1917. The receipts were £375,987, and the operating expenses £228,759. The city's share of this, equivalent to 7 per cent of the capital expenditure, was £113,010. The receipts per car-mile during 1917 averaged 14.69d., and the expenses per car-mile 8.93d. The estimated gross earnings for 1918 are £400,000.

The original zone fares were raised in 1916 by from 20 to 50 per cent by converting the 1½d. fare to 2d., the 2½d. fare to 3d. and some of the 2d. fares to 3d. The penny fare was not touched. Through this increase in fares, revenue jumped £60,000 to a total of £317,869 as compared with 1915. Even the number of passengers increased, at least apparently, from 61,000,000 to 70,000,000. The term "apparently" is used advisedly because careless conductors would issue two 1d. tickets instead of a single 2d. ticket, etc., thus obscuring the number of passengers. The present rates are as follows: For 1d., 1.29 miles; for 2d., 2.47 miles, and for 3d., 4.22 miles.

### UNIVERSAL FARE NOT FAVORED FOR EDINBURGH

It would be unfair to state that the United Kingdom does not contain believers in the American universal fare. One of them is Councillor W. J. MacLaren, who is an earnest advocate of better housing and who believes that a universal fare, say 1½d., would be a powerful influence in spreading the Edinburgh population. In a discussion which the writer had with Councillor MacLaren, he referred to Winnipeg as an example of what a universal fare had done to distribute the population over a wide area. Despite the fact that the Councillor lived in Winnipeg for several years, it may be respectfully submitted that the rapid and widespread growth of that great prairie city was due to more powerful causes than the universal fare. Likewise, the contracted area of Edinburgh can hardly be blamed on the zone fare in view of its topography and history

## Fares, Stages, Etc., Answers to Queries from Thirty-four Municipal Undertakings

| Systems | Have you Raised your Fares since 1914 | Average Length of Stages | | | | | | Do you Issue Transfers | Workmen's Tickets | | | | Do you Issue Tickets or Tokens at a Discount | State Charges for Children | Do you Issue Season Tickets | Concessions given to | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ½d | 1d | 1½d | 2d | 2½d | 3d | | Which Form of Tickets is Issued | Do you Issue ½d. Tickets | Times of Issue | | | | | Town Councillors | Corporation Officials | Soldiers and Sailors | Wounded Soldiers | Women on Military Duties | Nurses | Blind Persons | Police Force | Postal Employees |
| | | | | | | | | | | | Week days | Saturday | | | | | | | | | | | | |
| Aberdeen | No | 1025 | 1 1716 | — | 3 1255 | — | — | No | None | No | — | — | No | 3 to 12, half fare | Yes | Free passes to Councillors | None | Half fare | Free | Half fare | Half fare military | Free | None | None |
| Ayr | Yes | — | 1403 | 1 667 | 1 1476 | 2 786 | 3 55 | No | Single | Yes | 5 to 7 30 a.m<br>4 30 to 6 p.m. | 12 15 to 2.5 p.m. | No | School children, half fare | No | None | None | None | Free | None | None | None | Free | None |
| Belfast | Yes | — | 1 166 | 1 838 | 2 210 | 2 1599 | 3 472 | No | Single | No | Up to 8 a.m<br>5 to 6 p.m | 12 to 2 p.m | No | 3 to 14, half fare | No | None | None | None | Free | None | None | Free | None | None |
| Birkenhead | Yes | — | 1·651 | — | 2 1650 | — | — | No | Both | [illegible] | Up to 8 a.m<br>12 to 2 p.m | | No | 3 to 12, half fare | No | Mayor and Chairman free | None | 1d any distance | Reduced fares | Reduced fares | Reduced fares | Free | None | 1d any distance |
| Birmingham | Yes | — | 1 523 | 1 1734 | 2 1229 | 3 1268 | 4 773 | No | Both | No | Up to 8 a.m.<br>Return any time. | | No | 1 child up to 5, free 5 to 14, half fare | No | None | None | None | Free | None | None | Free | None | None |
| Blackburn | Yes | — | 1 | 1 616 | 1 1584 | 2 880 | 3 | No | Single | No | Up to 8 a.m<br>6 to 6 p.m | — | No | 3 to 12, 1d. any distance | No | None | None | None | Free restricted times | None | None | [illegible] | [illegible] | Contract |
| Bolton | Yes workmen's | — | 1 974 | 2 365 | 3 291 | 4·20 | 4 1493 | No | Return | No | Up to 8 a.m.<br>Return any time | | No | Up to 12, half fare | No | None | Chief Constable | None | Free restricted hours | None | Free | Free | None | None |
| Bradford | Yes | — | 1243 | 1 1170 | — | 2·851 | 3·930 | No | Single | No | Up to 9 a.m | | [illegible] | 5 to 16, ½d fare for 1½d. stage | No | None | None | None | Free | None | Institution nurses half fare | [illegible] | None | [illegible] |
| Burnley | Yes | — | 1 110 | 1 756 | 1 1462 | 2 636 | 2 1747 | Yes | Single | [illegible] | Up to 9 a.m<br>4 45 to 6 45 p.m | 12 to 1 30 p.m<br>— | Yes | 1 up to 8, free, two under 8, one fare | No | None | None | None | 1d any distance | [illegible] | None | Free | Free | None |
| Bury | Yes | — | 1480 | 1 198 | 1 1534 | 2 1042 | 3 711 | Yes | Return | No | Up to 8 a.m<br>Return any time | | No | School children, 1d. any distance | No | None | [illegible] | None | 1d any distance | None | [illegible] | [illegible] | Free | None |
| Cardiff | Yes | — | 1 440 | — | — | — | — | No | Single | No | Up to 7 30 a.m<br>4 30 to 6 30 p.m | 12 to 2 30 p.m | No | None | No | None | None | None | Free restricted hours | None | None | None | [illegible] | None |
| Dundee | Yes | — | 1 880 | 2 1000 | — | — | — | No | Single | No | Up to 7 a.m.<br>5 to 6 30 p.m | 12 to 1 30 p.m | No | 3 to 14, half fare | No | None | Reduced fares | None | Special cars free | None | Free | Free | None | None |
| East Ham | Yes | — | 1 1102 | — | 3 364 | — | 3 1365 | No | Both | No | Up to 8 a.m | | No | Half fare | No | Councillors free passes | Head officials free passes | None | None | [illegible] | [illegible] | Free | None | None |
| Glasgow | No | 1 264 | 2·545 | 3·809 | 4 1091 | 5·1320 | 6·1566 | No | None | No | | — | No | 5 to 15, half fare | No | None | [illegible] | Half fare | Half fare | None | [illegible] | Free | Contract £500 per annum | None |
| Halifax | Yes | — | 1·11 | 1·927 | 2·294 | 2·981 | 3 93 | No | Return | [illegible] | Up to 8 a.m.<br>Return any time after 9 a.m. | | [illegible] | 3 to 12, half fare | No | None | None | None | Free | None | None | Free | None | None |
| Huddersfield | Yes | — | — | 1·615 | 2·179 | 2 1385 | 3 919 | No | Return | No | Up to 8 a.m<br>Return any time. | | [illegible] | Children half fare | No | None | None | Free restricted hours | Free restrictions | None | Reduced rates | Free | £50 per annum | 1d any distance |
| Hull | [illegible] | — | 2 440 | — | — | — | — | No | None | No | — | — | No | 3 to 14, half fare | No | None | None | Half fare | Free | None | None | Free | None | None |
| Leeds | [illegible] | — | 1 | 2 | — | [illegible] | 4 | No | Both | Yes | Up to 7 45 a.m<br>Return any time | | No | Under 12, half fare | No | None | None | Free restricted hours | Free restricted hours | None | None | Free | None | None |
| Leicester | Yes | ·880 | 1·440 | 2·563 | — | — | — | Yes | Return | No | Up to 7 30 a.m<br>Return after 2 p.m | Return after 11 30 a.m | No | 6 to 14, ½d. fare on 1½d. stages | No | None | None | ½d. any distance | Free | None | None | [illegible] | None | Contract 10 % reduction |
| Leith | Yes | — | 1 563 | 1·1425 | 2 792 | 3 316 | 3·1513 | Yes | Single | Yes | Up to 8 a.m<br>5 to 7 p.m. | 12 to 2 p.m. | Yes | Under 12, half fare | No | None | None | None | [illegible] | None | None | Free | None | None |
| Liverpool | [illegible] | — | [illegible] | — | — | — | — | No | None | No | — | — | No | | No | Passes to Members of Committee on Council business | None | Reduced fares | Reduced fares | None | Reduced fares | None | None | None |
| London County Council | Yes | — | 1·1443 | — | 3·1108 | — | 5 845 | No | Both | No | Up to 8 a.m | | No | No reduction | No | None | None | None | None | None | [illegible] | Free | None | None |
| Manchester | Yes | — | 2 | — | — | — | — | No | None | [illegible] | — | — | [illegible] | 5 to 14, half fare | No | None | None | None | Free | None | [illegible] | Free | [illegible] | [illegible] |
| Newcastle | No | — | 1·1020 | 2 475 | 3·228 | 3 1372 | 4 1161 | No | Single | Yes | Up to 8 a.m<br>4 to 7 p.m. | 12 to 2 p.m<br>— | No | Up to 12, half fare | No | None | None | Half fare | Half fare | Half fare | Half fare | Half fare | [illegible] | 40 % reduction |
| Northampton | Yes | — | 1320 | 1 240 | — | — | — | No | Single | Yes | Up to 7 30 a.m. | | No | 5 to 12, half fare | No | None | £2, 2s. per annum | None | Free | None | V.A.D.* free | [illegible] | None | None |
| Oldham | Yes | — | 1·204 | 2·757 | 2 267 | — | 3·300 | No | Return | No | Up to 8.30 a.m<br>Return any time | | No | Two children for one full fare | [illegible] | None | None | None | Free | [illegible] | [illegible] | Free | Free | None |
| Salford | Yes | — | 1 140 | 2 1232 | 3 440 | 4·440 | 5 | No | None | No | — | — | No | 5 to 14, half fare | No | None | None | None | Free | None | V.A.D.* free | Free | None | None |
| Sheffield | No | — | 2 160 | 3·1406 | — | — | — | No | None | No | — | — | No | Under 15, half fare | No | None | None | None | [illegible] | None | Military nurses free | Free | None | None |
| Southampton | No | — | 1·680 | — | 3 | — | — | Yes | Both | No | Up to 8 a.m<br>Return any time. | | No | 3 to 10, 1d. any distance | No | Mayor and Chairman free | None | 1d any distance | 1d. any distance | None | 1d any distance | [illegible] | 1d any distance | Contract |
| South Shields | No | — | 2 140 | — | — | — | — | No | Return | No | Up to 9 a.m.<br>Return any time. | | Yes | Up to 12, half fare | No | Mayor and Chairman free | £3, 3s. per annum | None | Free | [illegible] | V.A.D.* free | Free | Free | Contract |
| Wallasey | [illegible] | — | 1·1556 | — | 3·1020 | — | — | [illegible] | Both | No | Up to 7 45 a.m<br>Return any time | | Scholars only | Reduced fares to school children | No | Councillors free passes | Head officials free passes | None | Free | [illegible] | Free | [illegible] | None | None |
| Walsall | No | — | 1 422 | 1 1337 | 2 1028 | 3 492 | 3 1537 | No | Both | Yes | Up to 8 a.m<br>Return any time | | No | Up to 12, half fare | No | [illegible] | None | None | Free | None | [illegible] | [illegible] | None | None |
| West Ham | Yes | — | 1 680 | — | 3 | — | 4 880 | No | Return | No | Up to 8 a.m<br>Return any time | | No | Up to 14, half fare | No | Councillors free passes | None | None | Free | None | None | [illegible] | [illegible] | [illegible] |
| Wigan | Yes | — | 1·243 | 1 1052 | 2·435 | 2 1548 | 3·778 | [illegible] | Both | No | Up to 8 a.m<br>Return after 5 p.m. | | No | Half fare | No | None | None | Half fare | Half fare | [illegible] | V.A.D.* half fare | Workmen's rates | Free | Contract |

*Volunteer Army Division.

FARES, STAGES AND SPECIAL CONCESSIONS ON THIRTY-FOUR MUNICIPAL TRAMWAYS IN UNITED KINGDOM. DECEMBER, 1918 as outlined earlier in this article. It is safe to assert that any houses built by the city or anyone else will be rented fast enough provided good transportation is furnished to reach them—and such additional transportation is a part of the electrification plans of the city, as will be seen.

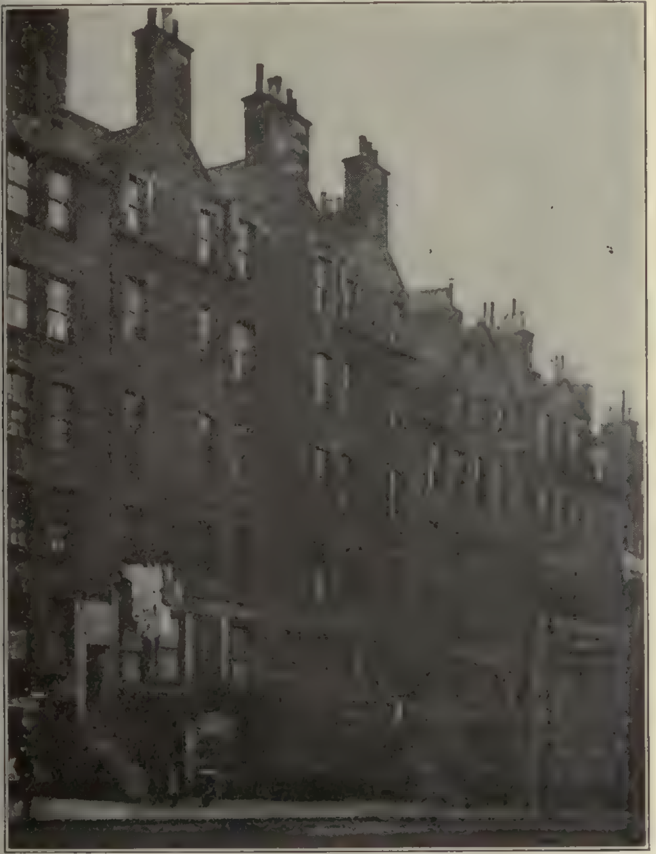
The suggestion of Councillor MacLaren for a universal fare with transfers was considered carefully in a memorandum of Nov. 18, 1918, prepared by R. Stuart Pilcher, general manager of the new Edinburgh Corporation Tramways. In this, Mr. Pilcher pointed out the following:

The universal fare system is based upon giving the greatest advantage to the regular and long-distance passenger. On the other hand, the short-distance passenger is not encouraged to ride by this system. The cash fare of 5 cents is distinctly heavy, and even with the discount it does not induce short-distance traffic. Persons who do ride for short distances—and they are considerable—have to pay for the long-distance rider. In fact, that is the principle of this system of fares. It is generally recognized that passengers can travel only so far for a particular fare, after which they are carried at less than cost price and thus at a loss.

The latest developments in America with reference to the fare systems are very interesting and have a direct bearing upon the question under consideration. Of recent years, and particularly since 1914, the American undertakings have been in financial difficulties. The working costs in different directions have been increasing, but the revenue has not been increasing in the same ratio. It has been found that the 5-cent basis for the universal fare was insufficient, and efforts were made to raise the basis. In some cases the public service commissions, which control the fares, agreed to the fare being raised to 6, 7 and 8 cents, but this is naturally most unpopular, especially with the short or intermediate distance passengers, whom it directly discourages. Efforts were also made to charge for transfers, and in many cases transfers are now charged for at the rate of 2 or 3 cents.

These expedients, however, were not sufficient to meet the rise in working costs. In order to overcome this difficulty, and to adopt a reasonable way of raising additional revenue, zones are now being introduced, the first zone in the center of the city being on the general fare basis of 5 cents. Additional zones are created toward the suburbs and into the outlying districts, the charge usually being at the rate of 2 cents for each zone entered. The introduction of zones in conjunction with prepayment means that the passengers going beyond the first zone must either have tickets provided showing the particular zones to which they are entitled to travel, or have the fares collected again as the car enters each new zone. I believe that the introduction of zones will mean the adoption of tickets, and this will do away with much of the advantage of the pay-as-you-enter system.

The universal system has been found to be wanting in flexibility, and it has also been realized by the tramway authorities that a large proportion of the passengers residing in the suburbs are being carried under cost price. The recent modifications in the system of fares in America, which I have described, make their system very similar to the European system, except that it does not provide for short-distance traffic by smaller cash fares than 5 cents.


OLD STYLE SIX- AND SEVEN-STORY FLATS IN HIGH STREET, EDINBURGH

MODERN STONE FOUR-STORY FLAT IN GORGIE SECTION, EDINBURGH

The system of fares known as the zone system is in universal use in this country. The tramway systems are divided up into 1d., 1½d. and 2d. stages, the principle of these fares being that passengers shall pay for their ride in proportion to its length. As a rule, the longer the ride the cheaper the rate of travel becomes. In pre-war days ½d. fares were introduced on most of the tramway undertakings; these covered rides varying in length from 600 to 1700 yd. Tramway managers are not in agreement as to the wisdom of introducing ½d. fares, but when restricted to distances which do not interfere with the revenue from penny fares, these fares bring in extra revenue and are an undoubted public convenience. Half-penny fares have been abolished on most systems during the period of the war. In some undertakings the zone fares are rather complicated owing to the multiplicity of stages, which are likely to baffle both the public and the conductors. On the other hand, the stages can be arranged on a simple plan to meet the requirements of both short and long-distance passengers.

The universal fare system could be applied to Edinburgh as suggested in Councillor MacLaren's memorandum, by arranging for the cash fare to be 1½d., ordinary tickets to be sold at five for 6d. or ten for 1s. It would, however, be necessary to give greater discounts to workmen and children than to the ordinary passenger as is done in the American system. I have taken the figures for the Winnipeg undertaking given in the memorandum mentioned. If similar discounts were given in Edinburgh, the average fare obtained would only be 1.19d. per passenger, whereas in 1917 the average fare for Edinburgh was 1.27d. per passenger. This is a difference of 0.08d. per passenger, and it would be equivalent to a decrease in receipts of £23,562,7s.7d. in the year.

In order to obtain the same revenue, it would therefore be necessary either to reduce the discount to workmen and children below that given in Winnipeg or to raise the cash fares higher than 1½d. Under this system of fares, workmen and children would be required to pay the same cash fare as ordinary passengers. There is no doubt that most of the regular passengers would provide themselves with discount tickets, but what of the poorer classes, many of whom ride infrequently? Would they be prepared to buy books of tickets for themselves and their children?

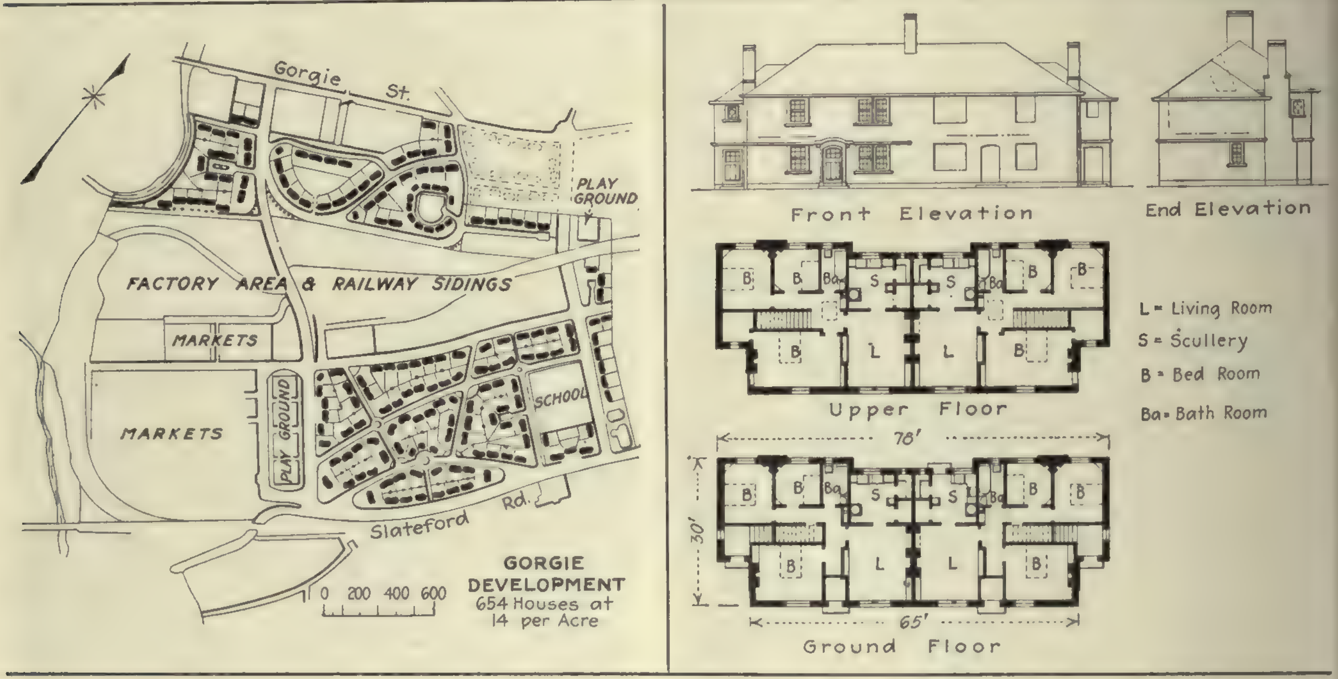
On the assumption that the 1½d. rate was sufficient and was adopted for the cash fare, there would be, however, some important difficulties in operating it. In the first place, a 1½d. fare is very inconvenient, as about 70 per cent of the cash tendered by passengers would require change. Secondly, a duplicate set of tickets would have to be kept by conductors, one set for cash payments and the other set for discount tickets. This would complicate the conductor's work considerably. Pay-as-you-enter cars with a universal system would, of course, do away with the necessity for tickets, but prepayment would require considerable alteration in the existing rolling stock, and this is assuming that the public would be so pleased with the new system of fares that they would give the necessary co-operation which the prepayment of fares requires.

I am in complete agreement with the objects which Councillor MacLaren aims at, viz., the provision of cheap, rapid and comfortable transit facilities to the outskirts of the city. I fully realize the importance of this question in relation to the provision of suitable dwellings away from the present congested city, but I believe that these facilities can be best obtained by adhering to the zone system of fares, rather than by changing to the universal fare system, which in America is being modified on the zone principle. At the same time I do not suggest that the present scheme of stages in use in Edinburgh is suitable to develop long-distance traffic. The scheme would need to be simplified by reducing the number of stages, and aiming rather at a cheap penny fare radiating from the center. This would not preclude the provision of facilities to give encouragement to short-distance traffic, which, I believe, the Edinburgh public will require in the near future.

Mr. Pilcher, it may be added, has had considerable personal experience with the prepayment system applied to zone-fare collection, having worked out a plan which was in use at Aberdeen for several years. In that city the method of fare charging is practically a combination of the zone and universal fare principles. As described in the April 26 article on Aberdeen, a universal fare of 1d. is charged for a ride from the center of the city to the end of any line, but in addition thereto a smaller fare (½d.) is in vogue for rides of stages up to 0.6 mile. The table given on page 856 prepared by Mr. Pilcher, gives a valuable summary of fares and stages on thirty-four municipal tramways in the United Kingdom.

During February, 1919, Mr. Pilcher presented to the tramways committee of the Council a report covering electrification and extensions of the present lines, following their acquirement for operation after June 30. After showing that the cable system is too inefficient to be retained, the report discusses the merits of span-wire, center-pole, side-pole and bracket-arm construction, it having already been stated by Messrs. Brodie, Hamilton and Campbell, consulting engineers, that the overhead electric system was generally better for Edinburgh and its suburban area than conduit or surface-contact systems or self-propelled vehicles like motor buses. Except for Leith Walk and Princes Street, span-wire construction, attached to rosettes where possible, is recommended. For Leith Walk. with is 69 ft. wide, it is suggested that the existing lighting poles be replaced by a center pole construction which will carry both lighting and railway circuits. For Princes Street, which is one of the great "show" streets of Europe, Mr. Pilcher recommends artistic side poles with bracket arms.

Conversion and reconstruction should be carried out



LAYOUTS FOR PROPOSED EDINBURGH HOUSING DEVELOPMENT AND SPECIMEN FOUR-ROOM, TWO-FLAT HOUSE EACH FLAT HAVING AN INDEPENDENT DOOR in sections to avoid prohibitive expense and to permit utilization of all existing buildings. About 250 new cars would be required, and these should average say sixty seats each. The cars should be vestibuled for the protection of the motormen, and they should be provided with extra entrances and exits for use during busy times. Magnetic track brakes should be provided on all cars, but cars for heavy grades should also have special mechanical brakes. A double-deck car seating sixty passengers does not need double trucks. A single truck with a wheelbase of 7 ft. to 8 ft. would give steadiness and would traverse the curves with perfect freedom. It would run with less noise, incur less wear and tear, and demand less energy than double trucks. These advantages offset the easier running of double trucks over curved track.

The present cable routes are entirely within the city limits, but in two cases parliamentary sanction has been obtained for extensions beyond the boundaries and additional powers will be requested, particularly for through running with the Leith Tramways. Leith is the harbor of Edinburgh, although a separate municipality. The extensions proposed are shown on the map on page 854. They total 7.24 miles of line, aside from later extensions for districts like Colinton.

As the proposed tramway extensions could not be constructed for two years at the earliest, Mr. Pilcher recommends their temporary operation with motor buses. To that end, and the possible development of other bus services, it is desirable that the city should apply for parliamentary powers to operate motor buses in conjunction with the tramway system outside the boundaries. Powers to operate within the city already exist. The immediate purchase of a few motor buses is urged as a supplement to the existing inadequate and unreliable cable service. Plans have also been approved for the enlargement of the Portobello Station (lighting, power and railway) from 10,000 kw. to 30,000 kw. capacity.

From the foregoing résumé of the plans for Edinburgh's electrification, it is obvious that a reasoned effort will be made to give the people the best possible service in the most efficient way, whether by the electric car or the petrol omnibus, and all under one management to secure proper co-ordination.

## Desirable Characteristics in Tramway Men

IN A PAPER delivered before the Institution of Electrical Engineers of Great Britain an analysis of the characteristics of tramway engineers and others is given. The estimate of qualities needed by certain grades of tramway officials follows:

| | Faculties — Percentages in All Cases | | | | | |
|---|---|---|---|---|---|---|
| Grade | Financial | Commercial | Technical | Custodianship | Bookkeeping | Administrative |
| General manager | 10 | 5 | 25 | 5 | 5 | 50 |
| Chief engineer | 2½ | 5 | 40 | 2½ | 5 | 45 |
| Power station engineer | .. | 5 | 40 | 10 | 10 | 35 |
| Assistant power station engineer | .. | 5 | 45 | 10 | 10 | 30 |
| Charge shift engineer | .. | 2½ | 82½ | 5 | 5 | 5 |
| Foreman | .. | .. | 85 | 5 | 2 | 8 |
| Traffic manager | 5 | 10 | 10 | 15 | 15 | 45 |
| Development superintendent | 5 | 35 | 5 | .. | 30 | 25 |
| Operation superintendent | 5 | 15 | 10 | 25 | 10 | 35 |
| Divisional traffic superintendent | 5 | 15 | 10 | 25 | 10 | 35 |
| Permanent way engineer | 5 | 10 | 35 | 10 | 5 | 35 |
| Assistant permanent way engineer | 5 | 5 | 30 | 20 | 5 | 35 |
| Foreman | .. | 5 | 50 | 20 | .. | 25 |

# American Engineering Standards Association Proposed

### Dr. E. B. Rosa Explains Plan and Purpose of the Engineering Standards Committee and Its Projected Expansion

In the May 1 issue of *Engineering News-Record*, Dr. E. B. Rosa, chief physicist, United States Bureau of Standards, gives at considerable length the first public explanation of the reasons for the widening of the organization of the American Engineering Standards Committee into the proposed American Engineering Standards Association. Some of the principal points in the article are covered in the following paragraphs. This association, if formed, will provide for representation of all societies interested in engineering standards, as well as the appropriate governmental bureaus.

### NO INTERFERENCE WITH SOCIETY INITIATIVE IS PROPOSED

The cardinal principles of the proposed American Engineering Standards Association are fair play and co-operation. Each society retains its integrity and initiative, and yet recognizes the existence and the rights of others; each society or government body manages certain work of research and standardization itself as now, but with the co-operation of representatives of other agencies invited to participate because of their interest in the subject and the information they can furnish.

The authority of the societies, which they enjoy by virtue of the representative character of the men composing their committees and the quality of their work, will remain undisturbed by the new organization. The Engineering Standards Committee, which will attend to the detail work of the Standards Association, will approve a standard because it is certified by some sponsor society and its co-operating committee, not because the central committee has itself examined it and passed an independent judgment upon it, which that committee will not attempt to do. The quality standards of the American Society for Testing Materials, the electrical standards of the American Institute of Electrical Engineers, the codes and standards of the Bureau of Standards, will derive their authority largely from the reputation of the sponsor bodies that prepare and certify them. They will, however, possess the added advantage that the Engineering Standards Committee, made up of representatives of all engineering and commercial interests and the government, will certify that the procedure of the committee has been complied with, that all interests concerned have been heard and there is every reason for accepting the standard and putting it into general use.

### ASSOCIATION WOULD ACT AS A STANDARDIZATION CLEARING HOUSE

In addition to a few conspicuous societies and government departments concerned in the making of standards, there are scores of others that co-operate and to some extent initiate such work. Heretofore each has had to find out for itself what work other societies were doing or contemplating, and establish connections as best it could for co-operation or for adjusting matters of conflict. There has been no central agency to keep a record of all standardization work in progress or being organized, to assist in securing the proper degree of co-operation and to avoid conflict and duplication of effort. The need for such a central co-ordinating agency has been felt for years; it was only a question of how it should be realized. The present committee has not yet attempted to meet this need. The reorganization proposed looks toward accomplishing this important result in an adequate manner.

The present Engineering Standards Committee is composed of fifteen men of the highest standing who represent five leading engineering societies; it was planned also to have representatives of the government. To provide a still broader representation it is now proposed to provide for representation of all organizations and government departments interested in the preparation of engineering and industrial standards. The larger societies should, of course, have a larger number of representatives than the smaller. Since there are many scores of societies and governmental agencies that may be expected to desire representation in such an organization, it would obviously soon become too large for a working standards committee. The evident procedure was to call the large representative body an association instead of a committee, and let there be formed within the association a standards committee.

### ONE SUGGESTION FOR A WORKING ORGANIZATION

One plan for the new organization provides for ten divisions of engineering and industrial organizations and two representing the government, as follows:

1. Electrical engineering and electrical industries.
2. Mechanical engineering and allied industries.
3. Mining and metallurgy and allied industries.
4. Civil engineering, architecture and building.
5. Chemical engineering and chemical industries.
6. Materials of construction (A. S. T. M. division).
7. Miscellaneous manufacturers.
8. Steam and electric transportation.
9. Automobiles, aircraft and other automotive vehicles.
10. Fire protection and safety engineering.
11. Federal bureaus and commissions.
12. Associations of state and municipal agencies.

The divisions would contain in some cases five to ten and in other cases as many as twenty or more national societies and manufacturers' organizations having a certain common interest.

Most of the business of the Standards Committee would probably be done by an executive committee and the paid general secretary and assistant secretaries acting under it. The various sections of the Standards Committee would be advisers to the executive committee on matters pertaining to their respective subjects. The Standards Committee would report annually to the American Engineering Standards Association, which, as a great self-determining national body, would authorize changes of procedure, provide for the selection of the Standards Committee and approve its budget and plans. Such an organization would be businesslike and effective, and as simple as that of any large national organization. The office staff should include some competent editors and draftsmen to assist in putting standards into good form for publication, in as uniform style as possible.

It would be desirable for the association to publish all standards prepared under its supervision in a uniform edition, fully indexed, and thereby make them readily available at small expense to the general public. In connection with such publication, they would be carefully studied to see whether there were conflicts or inconsistencies among them, and useful references would be made from one code or standard to another. Such publication in uniform style, with explanatory footnotes and cross-references, would be of enormous value. It would be the greatest step ever taken toward general acceptance and national uniformity in engineering and industrial standards. This would, of course, not interfere with the publication by each society of its own work in its proceedings.

### BUDGET OF THE COMMITTEE

The American Engineering Standards Association should have an annual income of not less than $50,000, in addition to the cost of publishing standards, which work would be self-supporting. This income would be derived from a large number of memberships in the association. These memberships would not be personal, but every member would represent some engineering or industrial organization or government department. If one member were appointed for every 500 members of an engineering society, and a membership fee of $50 were paid, this would amount to 10 cents per year per member of such society, and would not be a heavy tax for so important a matter. It would yield $1,000 (with twenty members appointed to the association) from a society of 10,000 members, and would give $50,000 per year when the association had 1000 members. As yet, however, no provision has been made for a large membership, and this proposal is only a suggestion for future consideration.

### PROPOSED ENGINEERING STANDARDS BODY SHOULD BE STUDIED IN DETAIL AND AS A WHOLE

The matter is of great and far-reaching importance, and there is no need for haste in coming to a conclusion. Full and sympathetic consideration should be given to the question. If anyone doubts the wisdom of the proposed plan, he should attempt to formulate a better one for accomplishing the end in view. Fortunately, there is no conflict of interest to confuse the issue. Everyone desires to see engineering and industrial standardization promoted. Everyone desires to see a large degree of co-operation in such work among the various societies and between such societies and governmental agencies. Everyone wishes to see fair play, with the recognition of the rights of all, and to discourage the spirit of autocracy either in engineering societies or in government departments. Since we are in full accord as to all the ends in view, it is only a question of method; and when the circumstances are understood alike by all, it is believed that full agreement will readily be reached. The members of the American Engineering Standards Committee have recognized the logic of the situation, and have proposed a wise and generous action.

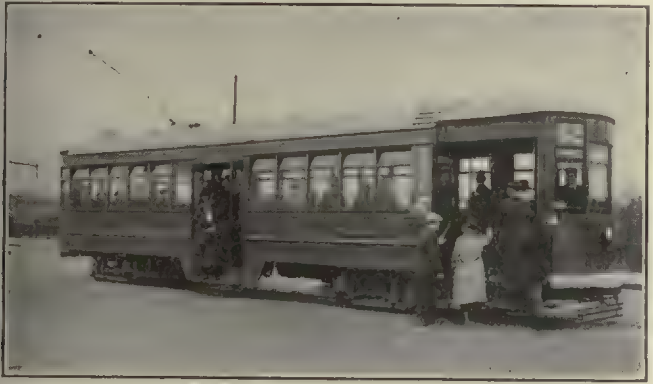
They have outlined a plan, for presentation to the founder societies, whereby the present organization can proceed with business at once but take in new organizations as they apply and qualify (when the constitution is amended), and when the membership has increased sufficiently to justify it, divide up into divisions and create a smaller Standards Committee with a central executive committee. It will thus gradually become the great national body it should be.

# Post-Payment Center-Exit Car in Philadelphia

## P. R. T. Is Trying Out "Public Service" Car Preliminary to Remodeling 1500 Near-Side Cars to Center-Exit Type

THE Philadelphia Rapid Transit Company has in experimental operation a new type of near-side car in which passengers enter by a double passageway on the front platform and leave by a double-door center exit. The conductor's position is at the center exit and all fares are paid as passengers leave. The new type has been christened the "public service" car.

The use of the near-side car, which was introduced as the Philadelphia standard in 1911, practically eliminated boarding and alighting accidents, as both entrance and exit were by the front platform directly under the supervision and control of the motorman. The perfection of automatic door-control devices, however, by means of which premature starting is prevented until all doors are safely closed, has led the Philadelphia management to consider the practicability of changing the exit to the center and putting the control of the exit doors in the hands of the conductor


ENTERING AND LEAVING PASSENGERS DO NOT IMPEDE EACH OTHERS' MOVEMENTS

CONSPICUOUS ROUTE SIGNS CONDUCE TO PASSENGER CONVENIENCE

### NEW CAR IS A QUICK LOADER

The preliminary operation of the car on a heavy business district line has demonstrated the new public service car with post-payment fare collection to be more than 10 per cent faster in loading and unloading, and there is the added advantage that the times of loading and unloading per average passenger are more nearly equalized. That is to say, under the prepayment plan more time was required to take on passengers than to let them off. By the new method passengers enter in two continuous streams without the interuption due to fare collection and without conflict with outgoing passengers.

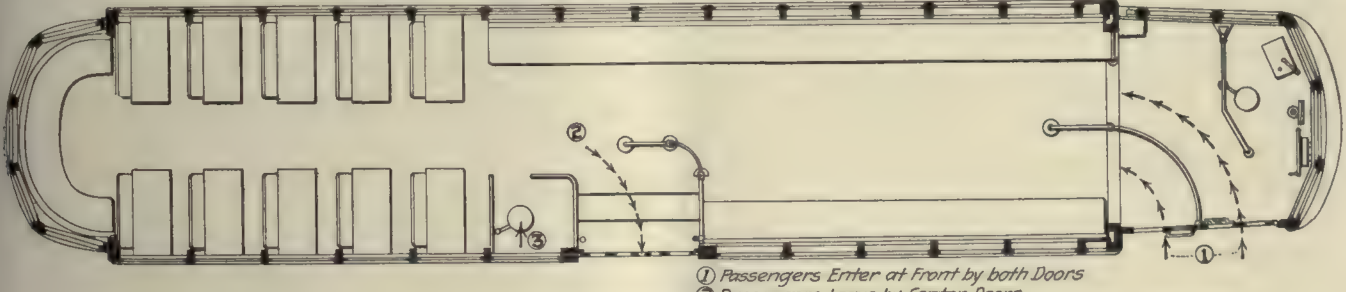
Many observations conclusively show that under the pay-leave plan, seven out of nine passengers have paid their fares to the conductor and stand at the exit door ready to alight before the car actually comes to a stop. The plan also offers greatly increased convenience to the passengers who now, instead of waiting to get their fares ready while exposed to the weather, are enabled at once to pass within the car and have opportunity to get their fares ready and obtain change and transfers while the car is approaching their destination stop.

### PASSENGERS DISTRIBUTE THEMSELVES WELL

Moreover long-distance riders now find it convenient to occupy the cross seats at the rear of the car, leaving the front for the short-distance riders who occupy the longitudinal seats. The indications are that this will encourage short-distance riding and largely overcome the tendency to crowd around the exit.

The saving in time in loading and unloading will be of direct advantage to the public, as it will enable the company to give increased service with the same number of cars equivalent to the addition of 200 cars because of the saving made possible by the continuance of the skip-stop system.

The exterior of the new public service car is painted a soft Quaker gray, and the interior color scheme is


①
②
③
① Passengers Enter at Front by both Doors
② Passengers Leave by Center Doors
③ Conductor Collects Fare upon Departure of Passengers

PLAN OF THE P. R. T. POST-PAYMENT, FRONT-ENTRANCE, CENTER-EXIT OR "PUBLIC SERVICE" CAR being worked out to give the effect most satisfactory to the passengers. The car is equipped with wooden seats shaped to give maximum comfort to the passenger of average build.

### MANY FEATURES OF NEAR-SIDE CARS ARE RETAINED

Ventilation is secured by the method originally introduced in the near-side car, in which the upper sash of the windows are hinged, so that the passengers themselves can open the sash inward at an angle, permitting the entrance of fresh air without producing a direct draft.

THE NEW PUBLIC SERVICE CAR
8213 ON ROUTE 42
DUE BROAD—EAST ON CHESTNUT
10.11 A.M. 1.05 P.M.
11.40 A.M. 2.26 P.M.
TRY IT
DUE BROAD—WEST ON WALNUT
11.59 A.M. 2.46 P.M.
1.25 P.M. 4.09 P.M.

THIS CARD IS USED IN SECURING CONSTRUCTIVE CRITICISM OF THE NEW CAR

The route number system, introduced by the management of the Philadelphia Rapid Transit Company in 1911, is also retained, and a changeable route number sign is carried on the side of the car as well as on the front.

The new car seats fifty passengers and is practically of the same weight and dimensions as the near-side car.

The sample car is kept in regular operation on a prescribed schedule which has been thoroughly advertised in the newspapers and in a bulkhead sign (reproduced herewith) posted in all of the company's cars. The management is inviting the public to inspect the car and make constructive suggestions, prior to the remodeling of the present 1500 near-side cars, which will be undertaken as soon as the new type has been thoroughly tried out and the need for any further changes determined.

CONDUCTOR HAS EXCELLENT SUPERVISION OF PASSENGERS ALIGHTING

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Trackless cars in Stockport, England, are reported not to have been a success, the municipal tramways committee having under consideration the substitution of motor buses for them.

# Price Level Will Stay Up

## General Course of Prices Since Signing of Armistice Points to Establishment of New Price Level

IN ITS EFFORT to give to the public a clear conception of the changed economic conditions of the world and the basic reasons why the country should not hold back in the expectation of a sudden recession of the general price level to the pre-war mark, the National Prosperity Campaign is meeting with a marked response on the part of many leading men. This campaign, as previously noted in these pages, has as chairman of its executive staff P. H. Gadsden, vice-president United Gas Improvement Company. The headquarters are in the Commodore Hotel, New York.

### INDORSEMENT BY GOVERNMENT LEADERS

An enthusiastic indorsement of the campaign was made this week by Secretary Glass of the Treasury Department before the convention of the United States Chamber of Commerce in St. Louis. Mr. Glass urged that every American citizen act in the spirit of the National Prosperity Campaign, whose efforts for the stimulation of business and confidence have been spread broadcast throughout the country, over the slogan of "LET'S GO." Secretary Glass continued: "We should start right away. We should break in upon this unnatural, abnormal suspension of commercial activities, for there is a world to be rebuilt."

Messages of support have been received from the governors of many states. Activity along the line of public improvements to help the industrial and labor situation is now under way, and there are unmistakable evidences of an earnest desire to assist in stabiliment and adjustment. In the opinion of J. P. Goodrich, governor of Indiana, the country is permanently on a higher price level, and it is idle to talk about getting back to prewar conditions.

Simon Bamberger, governor of Utah and formerly president of the Salt Lake & Ogden Railway (now the Bamberger Electric Railroad), states that existing prices have not in any way handicapped the State's activities, for the administration keenly appreciates the necessity for prompt action in matters providing employment. "Results," Governor Bamberger says," are what we are taking into consideration, rather than the matter of a few dollars and cents."

### HIGH PRICE LEVEL WILL CONTINUE

The sound economic basis for the work of the National Prosperity Campaign has been attested by many leading economists. To what has previously been presented in these pages, however, it seems worth while to add a few of the comments on the price situation recently made by T. S. Holden, investigator in the economics section, Division of Public Works and Construction Developments, Department of Labor. Mr. Holden directs attention to the fact that a comparison of the course of prices during the Civil War and the present war shows many points of similarity, but that the course of prices during the present period of readjustment and the corresponding period following the Civil War shows more points of difference than of similarity.

It was thirteen years after the Civil War before prices returned to the pre-war level. The principal cause of this return was the fact that there was such abundant opportunity for the development of new and more economical methods of production in the shape of new forms of machinery and new kinds of business organizations. These opportunities, however, are not present now in any measure comparable to the previous period.

From Oct. 1, 1918, to the present time, commodity prices have been going through an orderly process of readjustment. *Dun's Review*, says Mr. Holden, shows that although there have been many declining prices, others have been advancing at the same time. Of 313 commodities quoted on March 8, 1919, 140 were priced lower than a year before and 126 higher, the index figure indicating a reduction in the price level for the year of only 4.8 per cent. The commodities quoted lower consisted of certain foodstuffs, drugs and chemicals, wool, woolen and cotton textiles, metals and oils. With the exception of steel products, no building materials were quoted at prices lower than those last year. The principal commodities priced higher on March 8, 1919, than a year before were certain foodstuffs, lumber and other building materials, drugs and chemicals, hides, naval stores, oils, paint and tobacco.

The most marked declines since the armistice, Mr. Holden notes, have occurred in the case of lake copper and pig lead. In November copper was 69 per cent above the pre-war price, but since then it has dropped to the pre-war level. Pig lead in November was 79 per cent above the pre-war price, but now it is only 17 per cent above it. In both cases the cessation of the war left very large stocks on hand. Both commodities are usually exported in large amounts and there has been no export demand. Consequently, in Mr. Holden's opinion, the considerable decline in prices for these two commodities is not surprising.

Mr. Holden believes, therefore, that in general the course of prices since the armistice seems to bear out the theory that a new price level has been established. In conclusion he says:

> After a somewhat extended study of prices, it is the opinion of the Division of Public Works and Construction Developments that a new price level has been established by economic conditions attending the world war; and that economic forces appear to have already acted to stabilize prices at a level below which they are not likely to fall by any appreciable amount in the near future.
>
> It is believed that the growing confidence in the future of business in this country, evidence of which is seen on all sides, is well justified by the facts that have been learned through the study of the price situation.
>
> At the present time there is less concern over high prices than there is with regard to the stability of prices. It appears that the wisest business men are those who decide now to go ahead with the construction of buildings and the production of goods. The need for both forms of activity is more imperative now than ever before.

## Cost of Living Off Only 2.8 Per Cent Since Signing of Armistice

THE cost of living for American wage-earners declined 2.8 per cent between the signing of the armistice and the first week of March, 1919, according to a preliminary statement just issued by the National Industrial Conference Board. In March, 1919, the cost of living was still approximately 60 per cent to 65 per cent above the pre-war level, as contrasted with an increase of 65 per cent to 70 per cent in November, 1918, and of 50 per cent to 55 per cent in June, 1918, according to the board's two previous studies of the subject.

Changes since November, 1918, in the average cost of the different items entering into the budget were:

| | |
|---|---|
| All items | 2.8 per cent decrease |
| Food | 4.4 per cent decrease |
| Shelter | 1.7 per cent increase |
| Clothing | 6.2 per cent decrease |
| Fuel, heat and light | 1.3 per cent increase |
| Sundries | No change |

For the entire period July, 1914, to March, 1919, the changes in the respective items were:

| | |
|---|---|
| All items | 61.3 per cent increase |
| Food | 75 per cent increase |
| Shelter | 22 per cent increase |
| Clothing | 81 per cent increase |
| Fuel, heat and light | 57 per cent increase |
| Sundries | 55 per cent increase |

In estimating the change in the budget as a whole the constituent items have the following relative importance: food, 43 per cent of the total; shelter, 18 per cent; clothing, 13 per cent; fuel, heat and light, 6 per cent and sundries 20 per cent. These percentages are averages of the actual expenditures of several thousand families, based on the results of investigations by authoritative agencies. While families differ in the apportionment of their incomes among the separate budget items, the distribution for normal families does not vary widely from these averages. Hence, with any reasonable allocation of items in the budget, changes in the total cost of living are fairly uniform, and an estimate of 60 per cent to 65 per cent as the increase between July, 1914, and March, 1919, is representative.

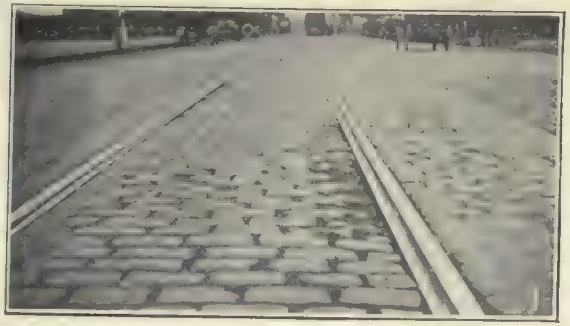
## New England Electric Freight Men Meet at Worcester

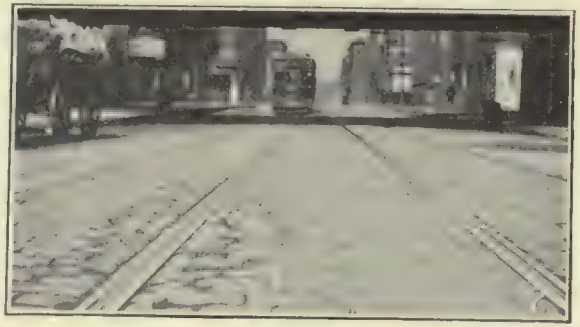
THE annual meeting of the New England Electric Freight Association was held at Worcester, Mass., on April 10, at the freight terminals of the Worcester Consolidated Street Railway. R. E. Cosgrove, freight and passenger agent Worcester Consolidated Street Railway, was re-elected president, and F. C. Lewis, general freight agent Boston & Worcester Street Railway, was re-elected secretary.

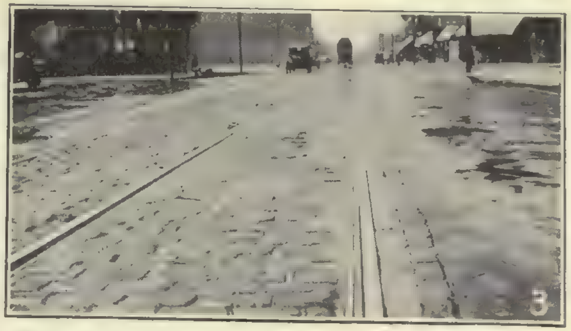
A committee was appointed to report at the next meeting upon the advisability of extending the scope of the organization to include local agents and representatives of auditing departments. This comprises P. P. Crafts, Bay State Street Railway; A. E. Paddock, Rhode Island Company, and H. R. LaMontagne, Worcester Consolidated Street Railway. It was also decided to hold the monthly meetings in Boston on the same days as those on which the New England Street Railway Association meets, in order to enable members to attend the meetings of both associations.

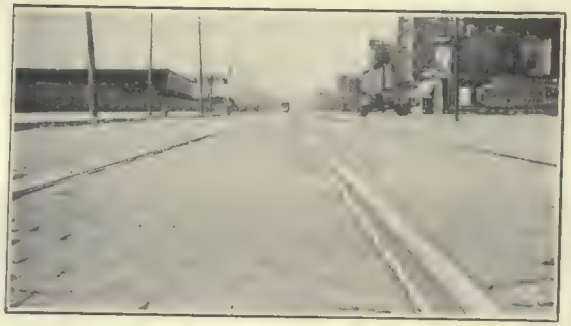
Among the topics discussed at the meeting was that of further development of the freight business by use of through tariffs with connecting carriers. As this involves the matter of auditing as well as that of operation the discussion will be resumed at the next meeting with auditing specialists present. Another topic was that of automobile truck competition, which was covered by B. F. Curtis, traffic manager Norton Company, Worcester, who demonstrated that the trucking business on the basis of freight rates is a losing proposition. Mr. Curtis believes strongly in trolley freight transportation. H. C. Page, general manager Worcester Consolidated Street Railway, and A. E. Stone, general manager Boston & Worcester Street Railway, expressed their belief that one of the rays of hope in the future of the electric railway business is the possibility of obtaining additional revenues from freight transportation.

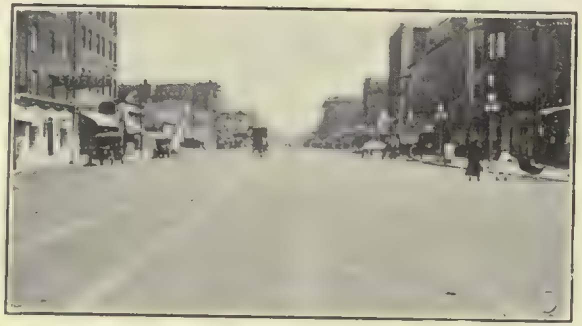
# Appearance of Street Surface With Various Types of Track in Chicago

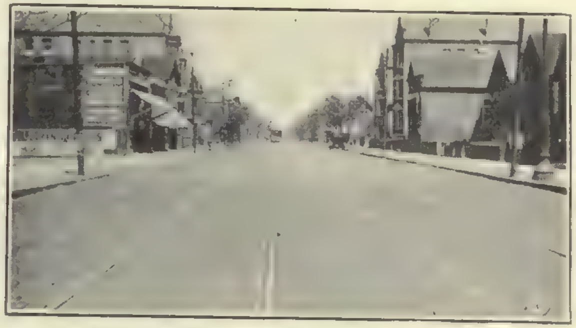


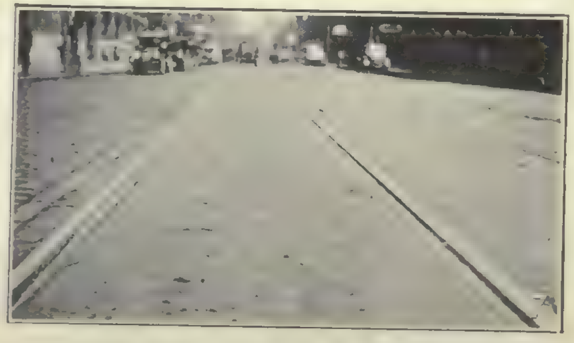


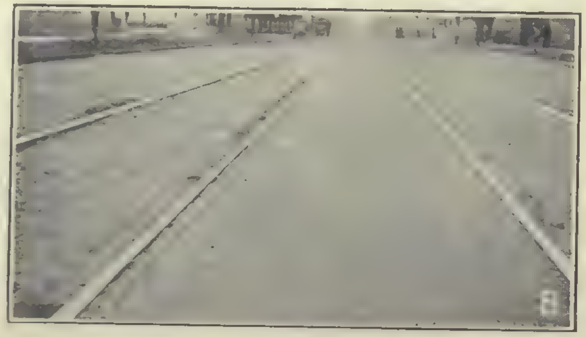


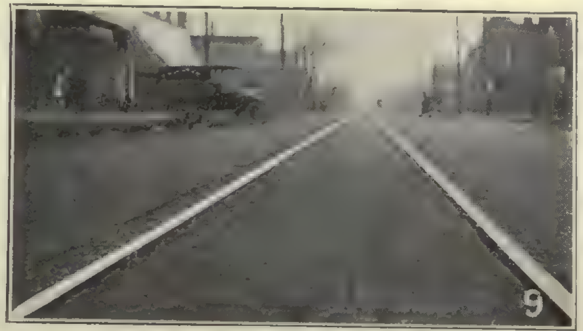












No. 1—Type No. 1, track laid in 1907 with sand cushion.
No. 2—Left track type No. 2A, right track type No. 1 both laid in 1907 with sand cushion.
No. 3—Type No. 2A, laid with sand cushion in 1907, ties spaced 4 ft.
No. 4—Type No. 2A, track laid with sand cushion in 1909, ties spaced 3 ft.
No. 5—Type No. 2A, track laid with mortar cushion in 1911, ties spaced 3 ft.
No. 6—Type No. 3, track laid in 1910, ties spaced 2 ft., outlying district.
No. 7—Type No. 3, track laid in 1909, ties spaced 2 ft., Loop district.
No. 8—Type No. 4, track laid in 1910 with sand cushion.
No. 9—Type No. 4, track laid in 1917 with mortar cushion.

# Chicago Rehabilitation Track Standards Prove Successful

### Five Standard Types Adopted in 1907 and 1909 Promise to Give Long Life and Good Service—Study Made of Rail Corrugation as Influenced by the Several Types of Track Construction—Ninety-two Per Cent of Track Now Standard Construction

UPON reference to old track records of 1905 for the various electric railway lines of the city of Chicago, it will be found that the track foundation at that time was the natural soil consisting of sand and clay and a combination of the two, divided in about the proportions 28 per cent, 16 per cent and 56 per cent respectively. The rail sections were chiefly 6-in., 7-in. and $7\frac{3}{16}$-in. Johnson Company, with 7-in. "trilby," 9-in. Cambria and 9-in. Wharton in a few locations. In the paving granite block, asphalt, cobble and cedar block was used in about the proportions 22 per cent, 3 per cent, 15 per cent and 60 per cent respectively. Oak ties were used in all cases. These might be said to represent Chicago standards in 1905.

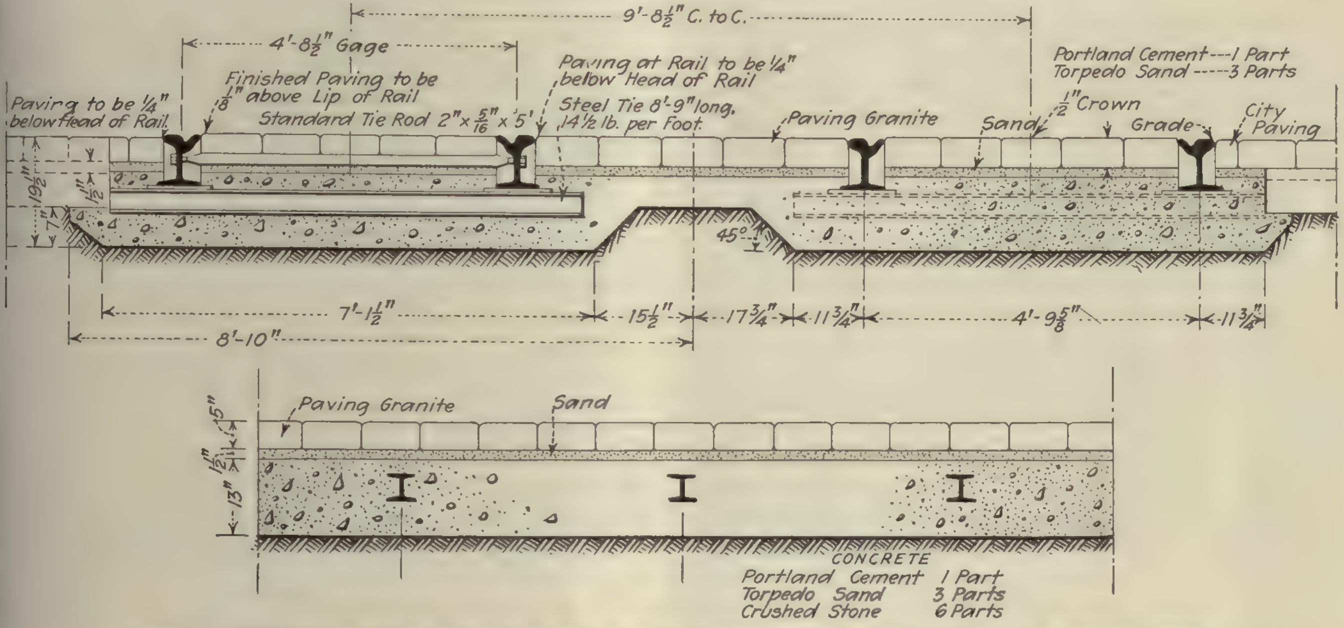


FIG. 1—CHICAGO STANDARD TRACK TYPE NO. 1; CONCRETE FOUNDATION AND STEEL TIES

NOTE—In accordance with Resolution No. 1251 passed by the Board of Supervising Engineers on June 29, 1909, all new tracks built hereafter, unless otherwise specifically ordered, shall be 10 ft. 2 in. center to center; and all other dimensions on this drawing that will be affected by this increased track center must be changed accordingly.

Outside rails to be ½-in. lower than inside rails.

Pavement to be granite block as specified in the ordinance of Feb. 11, 1907, unless otherwise ordered.

On cable construction space ties to the same centers as cable yokes.

On all other work space ties on 4 ft. centers.

Pavement to be swept with dry gravel only.

The era of rehabilitation in Chicago began about the year 1907, when a city ordinance was passed providing for a board of supervising engineers. This was to be a non-political body created for the purpose of administering the ordinances by which it was created, which also included provision for the complete rehabilitation of the Chicago railway properties.

As the board desired to begin at the source, or so to speak at the ground, and to work up, the subject of foundation and ties was the first to receive consideration. An exhaustive study was made of this question and the ideal seemed to be a permanent foundation upon which the superstructure could be placed and renewed from time to time as is done with a bridge structure. At about that time the cities of Toronto and Montreal, Canada, had laid some concrete foundation and were placing the rails directly upon this foundation without the use of ties. To maintain the gage, the rails were fastened together with tie rods and the paving was depended upon to hold the track in place. Detroit, St. Louis and other cities had also been experimenting with various forms of concrete beams. None of these appeared to the Board of Supervising Engineers of Chicago to be a type of construction which would insure permanency. Many large cities were visited, including Toronto and Montreal, and the various types of construction were studied. After convincing itself that steel incased in concrete suffers no corrosion the board adopted as its first choice for standard construction steel ties 4½ in. deep, spaced on 4-ft. centers and imbedded in concrete slab foundation 13 in. thick of which 6 in. is below the ties.

Investigation also developed the fact that a wood tie in the best condition is greatly preserved when incased in concrete, and the second choice adopted as a standard was construction involving thoroughly dry, sound, 90 per cent heartwood yellow pine, untreated ties, 6 in. thick, spaced at first on 4-ft. centers and later reduced to 3 ft., and incased in concrete to a total depth of 14⅝ in., 6 in. of which is below the ties. To protect the wood tie from the wear of the rail, tie plates were incorporated in the standard construction, as was also the screw spike, to facilitate renewal of rails and plates.

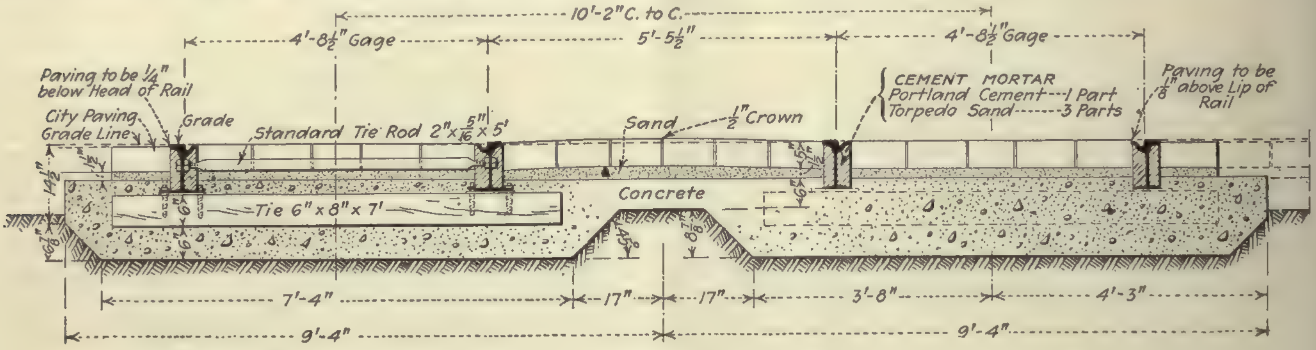


FIG. 2—CHICAGO STANDARD TRACK TYPE NO. 2A; CONCRETE FOUNDATION AND WOOD TIES

At this time the subject of tie treatment also received broad consideration. The zinc chloride process was recommended by authoritative engineers, in consequence whereof a length of test track was constructed incorporating this class of treated tie. It was found, after the track had been in service some time, that many of the rail spikes had been eaten away until they were no larger in diameter than a pencil. This trouble was studied carefully with the assistance of chemists and it was found that the moisture in combination with the zinc chloride produced a chemical galvanic action with the liberation of hydrochloric acid and the formation of free chlorine. Thus the decision was reached that for a moist climate the treatment of ties with chloride of zinc was a failure and during the first year of the existence of the board all such treatment was dispensed with.

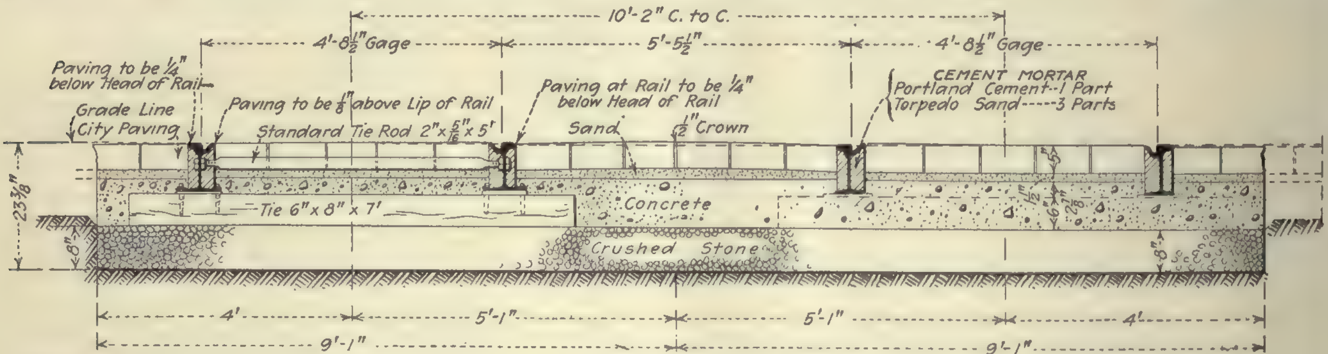


FIG. 3—CHICAGO STANDARD TRACK TYPE NO. 3; CRUSHED STONE WITH WOOD TIES IMBEDDED IN CONCRETE

For various reasons a solid concrete foundation is not always desirable nor even feasible, so another standard foundation to be used in conjunction with that of solid concrete was sought. As it was desirable to retain the permanency feature, it was practically necessary to use concrete in the surface of the foundation for tie protection and to provide a paving base. Thus the third standard is 8 in. of crushed stone ballast rolled on a rolled earth subgrade. The same standard wood tie is placed upon this, spaced on 2-ft. centers, and concrete is placed between and above the tie to a total depth of 8⅜ in. About 27 per cent of the present track construction is of this type.

The above are the three main standards of foundation and ties used in Chicago. In some of the outlying districts where all improvements, such as sewer, water and gas have not been installed, two other types of track are permitted. The first is 8 in. of slag ballast with wood ties laid upon it and concrete placed between and over the ties to a total depth of 7⅜ in. The second is 12⅜ in. of slag ballast in which wood ties are imbedded to a depth of about 5 in., with 8 in. under the tie, and over which is placed 4 in. of limestone. These two types of foundation are very little used. In addition to these five standard types of foundation the concrete slab sub-ballast type has been used in a special case to overcome conditions created by necessity for construction over a new deep and wide fill. This was described in the ELECTRIC RAILWAY JOURNAL for March 30, 1918, page 609.

The rail section adopted as standard for the first three types of foundation described was a 9-in., 129-lb. grooved girder rail. This type is used in nearly 90 per cent of the track in Chicago. For the slag concrete foundation a 7-in., 91-lb. T-rail is used, and with the slag limestone foundation, a 7-in., 80-lb. modern improved girder rail.

### PAVING LAID ON DRY MORTAR CUSHION

The greatest element that contributes to the destruction of paving is water. Consequently that pavement which has the longest life and which is best for the public use is that most nearly water-tight. In Chicago, therefore, the granite-block pavement has been adopted wherever its use is possible, and it is standard for all types of construction and foundation. In some of the construction in outlying districts, on streets where improvements are not made and where vehicular traffic is light, the use of vitrified brick paving or granite screenings for surfacing is permitted.

With the granite block paving the city specifications called for a sand cushion and joints to be filled with pitch, the space under the head of the rail and next to the web being filled with cement mortar. Much trouble was at first experienced with this paving, as it very often fell along the edge of the rail. After a rain the water seeped into the paving, passing traffic produced a pumping action, and the sand was forced up through air holes, leaving rings of sand around the holes on top of the pavement. After enough sand had been forced out, the paving naturally fell. The railways had advocated grout instead of sand and pitch as a joint filler, but because of the difficulty of renewing the pavement the city specifications had eventually been adopted. A grout filler was soon tried out, however, and at the same time a new cushion, composed of a mortar, including one part of Portland cement and three parts of torpedo sand, spread dry upon the surface of the concrete foundation to a depth of 1½ in., was used. The granite blocks were laid upon this and the joints filled with a wet grout. Just enough water from the grout passes through to the cushion to form a cement mortar. Thus the advantage of a sand cushion is obtained for laying the blocks and at the same time all disadvantages are removed after the paving is laid, as the cushion hardens and rigidly holds the blocks in place. This type of paving cushion is now used almost entirely with both granite block and brick paving.

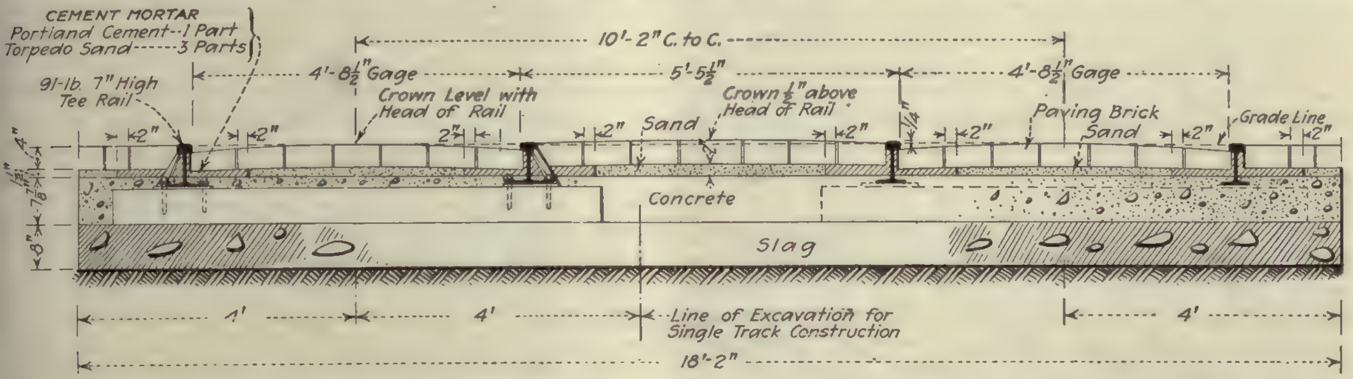


FIG. 4—CHICAGO STANDARD TRACK TYPE NO. 4; SLAG FOUNDATION WITH WOOD TIES IMBEDDED IN CONCRETE

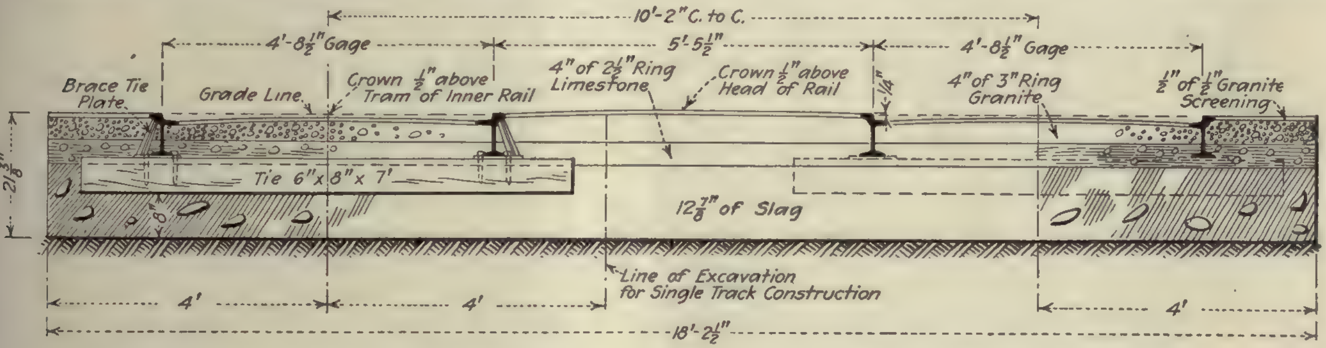


FIG. 5—CHICAGO STANDARD TRACK TYPE NO. 5; SLAG WITH WOOD TIES IMBEDDED IN SLAG AND CRUSHED LIMESTONE

At locations where the remainder of the street is to be paved with wood block, the specifications permit wood block to be used on the railway pavement area. The blocks are laid on the sand and cement cushion, 1½ in. deep, and the joints are filled with cement grout or pitch.

Following is a summary of the standards as illustrated in Figs. 1 to 5: Type No. 1 (Fig. 1) consists of 9-in., 129-lb. Chicago standard grooved girder-type rail supported on Carnegie steel ties, 6 ft. 9 in. long and weighing 14½ lb. per foot, spaced 4 ft. apart, laid with the 6-in. face up and imbedded in concrete consisting of one part Portland cement, three parts sand and six parts crushed stone to a total depth of 13 in., 6 in. of which is below the tie. Upon the tie under each rail is a tie plate, 6 in. x 10 in. x ½ in., fastened to the tie by the wedge and clip device, and the rail joints are electrically welded by the Lorain method. Gage is maintained by forged or rolled tie rods with 1-in. terminals, spaced on 6-ft. centers. Upon the top of the concrete is 1½ in. of dry mortar, composed of one part Portland cement and three parts of torpedo sand, upon which are laid dressed granite paving blocks, 4 in. to 5½ in. wide, 7 in. to 12 in. long, 5 in. to 5½ in. deep and the joints filled with cement grout filler composed of equal parts of sand and Portland cement.

After some time had elapsed, tests were made to discover whether the steel ties and concrete were doing full duty. It was soon found that the concrete did not retain a good contact under the base of the rail between the steel ties, and for this reason the ties were required to transmit the full load until the rail deflected under load to a bearing on the concrete. To overcome this a reduction in spacing to 3 ft. would have been necessary. This would have been expensive with steel ties and for this reason in Type 2A wood ties were adopted and spaced on 3-ft. centers. There is only a small amount of Type No. 1 construction, and a reduction to a 3-ft. spacing of steel ties for any further construction of this type is being considered.

In Type 2A (Fig. 2) the track consists of the same rail section as in Type 1, supported on 90 per cent heart longleaf yellow pine ties, untreated, 6 in. deep by 8 in. wide by 7 ft. long, spaced 3 ft. apart, imbedded in concrete of the same proportions as in Type 1, to a total depth of 14⅞ in., 6 in. of which is below the tie. Upon the tie, under each rail, is a shoulder tie plate, 7½ in. wide, 9½ in. long and ½ in. thick, fastened to the tie with two ⅜-in. x 2½-in. fetter thread lag screws. The shoulder of the plate against the outside edge of the rail base and the rail joints are electrically welded as in Type 1 and the rails fastened by screw spikes. Tie rods and paving for Type 2A are the same as for Type 1.

In Type 3 (Fig. 3) the track consists of the same rail section, ties, tie plates, rail fastenings and tie rods as in Type 2A, but the ties are spaced on 2-ft. centers and rest upon 8 in. of 1½-in. run of crushed stone foundation rolled on a rolled earth subgrade. Concrete of the same proportions as in Type 2A is placed between and above the ties to a total depth of 8⅝ in. The paving for Type 3 is the same as for Type 2A.

The track for Type 4 (Fig. 4) consists of 7-in., 91-lb. modern Shanghai T-rail, supported on wood ties as in Types 2A and 3, resting upon 8 in. of furnace slag broken to pass through a ring 6 in. in internal diameter, covered with fine slag, limestone screenings, cinders, rolling-mill ashes or foundry sand to fill all interstices and rolled with a 10-ton roller. Concrete is placed between and over the tie to a total depth of 7⅞ in. Upon every other tie and under each rail is a tie plate, 6 in. x 9½ in., fastened to the tie, when used with screw spikes, by the same lag screw as in Types 2A and 3, and when used with track spikes with two ⅝-in. x 2½-in. hook spikes. Upon every other tie and under each rail is placed a 7½-in. x 10-in. malleable-iron brace tie plate fastened to the tie by either lag screws or hook spikes as above. These tie plates and braces have an inclined upper face which cants the head of the rail slightly toward the center of the track for the purpose of causing the wheels to bear nearly over the centers of the webs. Rail joints are electrically welded by the Lorain process as in other standards. Upon the concrete is placed the dry mortar as in previous types, except that the cement mortar rail filler also extends back from the rail some 10 in., and upon this are placed repressed vitrified paving brick not less than 8 in. long, 4 in. deep and 2½ in. thick, with grouted joints.

In Type 5 (Fig. 5) the track consists of 7-in., 80-lb. modern improved girder rail, supported on the same tie as Types 2A, 3 and 4, imbedded to a depth of 4⅞ in. in 12⅞ in. of the same class of slag as in Type 4. The same flat tie plates and brace tie plates are used as in Type 4, with hook spikes. Rail joints are bolted for temporary construction, but if the construction is more or less permanent, they are electrically welded. Upon the slag is placed 4 in. of 2½-in. ring limestone, covered with limestone screenings to fill the interstices. Upon this is placed, between rails, 3⅝ in. and between tracks and outside tracks 4 in., of 3-in. ring granite covered with ½-in. of ½-in. granite screenings flooded and rolled.

### STUDY IS MADE OF RAIL CORRUGATION

In connection with the above standards an extensive study has been made of rail corrugation, as described in the ELECTRIC RAILWAY JOURNAL for Nov. 21, 1916, page 1012. Many authorities attribute corrugation to a rigid foundation, but this is certainly not the full explanation, for in Chicago corrugation has developed on both the concrete and the crushed-stone foundations. The crushed stone might be termed a semi-rigid foundation, as it would be less resilient than sand or gravel or even slag, but no concrete is placed beneath the ties and that between them does not always give rail support. Also, in the same stretch of track on a concrete foundation, part of the rail will show corrugation and part will not.

On the other hand there has been an interesting test of a sand foundation. At a certain location in Chicago, due to the sewer program of the city which called for early improvements, some track was laid on a sand foundation only. At a little later date the sewerage work was completed on part of this street and the adjoining track was placed on a concrete foundation and paved while the remainder was left on the sand foundation. Some corrugation soon developed in the track placed on the concrete, while that on the sand continued immune. Concrete is now being placed between and over the ties on the sand foundation and a careful study of results is being made.

This experience would cause many to jump at once to the conclusion that the mystery of the cause of rail corrugation had been solved, but such is not the case. In fact, the Chicago authorities are inclined to believe that the relation of the tread of the wheel to the contour of the rail head, truck nosing, off-center gear drive, etc., are contributing factors in the formation of corrugation. Study is being made on the effect of changing the contour of the wheel. Investigation is also being carried on in respect to new track to detect the first indications of corrugation.

If in the end it should be determined that corrugation is caused by a rigid foundation, the question still remains as to which is the greater of two evils—no corrugations and a poor foundation which will not hold up the paving and will thus allow water to leak in and soon destroy the paving altogether, or a rigid foundation with firm smooth grouted paving which is water-tight, but which creates a necessity for handling the corrugations in some other manner.

### STANDARDS GIVE LONG LIFE AT LOW COST

As far as can be determined, the Chicago standards have proved very successful and the indications are that a comparatively long life will be obtained from the track. Of course on practically any track that has been in service for any considerable length of time certain locations can be found where on the face of the appearance the construction might appear to be a failure. A study of these particular instances may show that unforeseen local conditions have contributed to the failure and that the standard in principle is satisfactory. The fact that during the past eleven years it has not been found necessary to change these standards is proof in itself that to the Chicago authorities at least the standards seem highly satisfactory. As mentioned in the foregoing text, some little trouble was experienced with the paving, but the adoption of a dry mortar cushion and filling of the interstices with grout seems to have eliminated this difficulty.

The standard used in any piece of construction depends largely upon the local equation, the condition of the subsoil, *e.g.*, whether wet, dry, firm or sandy, the type and amount of traffic both car and teaming, the possibilities of excavation being necessary in the near future, etc. A great deal of the construction in the Loop district, the main business center of Chicago, is Type 3. The reasons for this are two. The first is that for many years a subway construction in this district has been an imminent possibility and in the track reconstruction made necessary, it would be much easier to break up a bed of concrete 8⅝ in. thick than one 14⅝ in. thick. The second is the difficulty of constructing Type 2A under traffic.

Altogether since 1907 about 719 miles out of 803 miles of track have been rehabilitated and 192 miles of new track constructed. This shows that 92 per cent of the total surface mileage outside of yards is now standard construction. Of this standard construction the percentage of each of the five standard types now in use is about as follows: Type 1, 1 per cent; Type 2A, 58 per cent; Type 3, 27 per cent; Type 4, 9 per cent; Type 5, 5 per cent.

The photographs on page 864 show the present condition of track of the various standards.

## The Proposed Ford Light-Weight Car

### No Likelihood That It Will Be Out of the Test Stage for at Least a Year — No Decision Even as to Commercial Manufacture

WHEN Henry Ford announced early in April that he was prepared to build an extremely light-weight car for gas drive, a representative of the ELECTRIC RAILWAY JOURNAL immediately called upon him and upon Charles E. Sorensen, general manager of Henry Ford & Son's tractor plant at Dearborn. In this interview, as reported in the April 19 issue, Mr. Ford expressed his belief in a greater field for transportation on rails if city railways would use light cars operated at more frequent intervals and, where feasible, make use of a graduated fare. He also stated in this interview that the same principles of light-weight construction proposed for his gas car could be incorporated in an electrically-driven car.

Since the foregoing discussion Mr. Ford has given further proof of his purpose by securing franchises for the operation of a street railway to connect his tractor plant at Dearborn with his blast furnaces and shipbuilding plant on the Rouge River, a distance of 5 to 6 miles. The plants, of course, are gradually being surrounded by the homes of the workers, but more of the men would settle near their work if better transportation were furnished. The terms of the franchise call for operation with either gas or electrically-driven cars within one year. In any event, this undertaking to build a railway is most significant as coming from a man who has done more than any other individual to make the automobile cheap and popular.

### CAR ITSELF IS STILL IN THE GASEOUS STATE

While the statements made by Mr. Ford to the public of Detroit and the franchise application described indicate that Mr. Ford is in earnest, it is a matter of vital importance to the street railway industry to know that there is no early prospect that the car itself will be available. What follows on this subject is based in part upon the interview with Mr. Ford on April 15 and with Mr. Sorensen on April 23.

In the first place, Mr. Ford has no present intention of going into the business of building street cars. His chief desire is to prove that a car of extremely low weight but powerful construction can be built by using high-grade steels and alloys similar to those developed for the severe conditions that have to be met by a tractor. He proposes to take his time to make any necessary experiments so that the completed car will not have to be tinkered with. Once he has attained his ideal, he may be willing to turn over the mass production of the car to any "live wire" in the business who has the faith to produce in large quantities at low prices.

In discussing the matter with Mr. Sorensen it was brought out that one-man operation would be an essential if the car was to be an economic success. Further, the moment it was operated as a one-man car, it would necessarily have to be equipped with a variety of automatic safety appliances that would meet the approval of the railways themselves, the car operatives and the regulatory bodies. As an example, the history of the Birney safety car was cited. That car had been the first to deserve the name "standard" because of the very feature, lightness, that was to be so important a characteristic of the Ford car. Yet despite its manifest advantages and great success, much opposition had to be overcome since the car had been brought out four years ago. After Mr. Sorensen had examined views of a number of safety car installations he said that if the Birney car could be made of material still lighter and better it would never be able to catch up with the orders.

### ANY DRIVE CAR WOULD HAVE TO BE OF SAFETY TYPE

With regard to the Ford street car development, which would supplement rather than injure the good work done in electric car design in recent years, Mr. Sorensen said that this company would certainly look into the use of every device that would promote both safety and economy, such as the inter-operation of brakes, doors and steps. He knew that Mr. Ford would insist upon the best even down to such a detail as air-brake piping because the best piping was not merely the lightest but also the piping that could be made airtight most readily. Absence of leakage meant a smaller compressor. Matters like that were not to be left to the choice of the purchaser. It was up to the manufacturer to see that the customer was started right instead of being permitted to use something that was costlier in the long run.

The Ford car would have ball bearings everywhere. At the same time the company realized that such bearings are subject to severe conditions in electric railway service so that it deems better balls a necessity. Mr. Sorensen showed some balls of outside and home manufacture which had been tested to see how good a ball it really is possible to produce. He maintained that neither for the tractor nor for an electric car could ball bearings be any too good. They would be particularly valuable to insure low resistance in starting.

At the present writing not even the size of the car has been fixed.

There would probably be from fourteen to sixteen double seats, or a little less than the Birney. To make the proposed high rates of acceleration and braking comfortable, these seats would be more like automobile than car seats. The trucks would probably be made of pressings. All axles would be driving axles, driven by the engine through worm gearing. The size and character of the engine was still a matter of doubt, although Mr. Sorensen pointed out that the engine of the Fordson tractor uses gasoline only for starting, kerosene being the fuel used in running.

# Chamber of Commerce Shows Appreciation of Electric Railway Situation

### At Meeting Held in St. Louis on April 28 to May 1 the Plight of This Utility Was Clearly Set Forth and an Appropriate Resolution Was Adopted—P. H. Gadsden Was Elected a Director

THE outstanding feature of the meeting of the Chamber of Commerce of the United States, held this week on April 28 to May 1 in St. Louis, from a public utility point of view, was the presentation of the needs of the electric railways of the country. The attendance of representative business men from all sections was large, and the evidence presented of the necessity of the electric roads for greater income if they are to supply the needs of good service was convincing. At the same time there was convincing testimony of the vital connection between good local transportation facilities and the industrial life, comfort and prosperity of the communities served.

The public utility program at the convention was initiated by a report to the council of its committee on public utilities. This committee, whose appointment was mentioned in the issue of the ELECTRICAL RAILWAY JOURNAL for Apr. 19, 1919, page 792, consists of the following:

Lewis E. Pierson, Irving National Bank, New York, (chairman); Henry G. Bradlee, president Stone & Webster Management Corporation, Boston, Mass.; Arthur W. Brady, president Union Traction Company of Indiana, Anderson, Ind.; F. B. DeBerard, director of research, Merchants' Association, New York; P. H. Gadsden, vice-president United Gas Improvement Company, Washington, D. C.; E. K. Hall, Electric Bond & Share Company, New York; Albert W. Harris, president Harris Trust & Savings Bank, Chicago; Charles L. Harrison, Chief of Ordnance, Cincinnati District, Cincinnati, Ohio; J. W. Lieb, vice-president New York Edison Company, New York; P. W. Myers, president St. Paul Association of Public and Business Affairs, St. Paul, Minn.; James S. Havens, Eastman Kodak Company, Rochester, N. Y.

The report of the committee on public utilities follows in full:

#### REPORT OF SPECIAL COMMITTEE

"The public utilities which you have asked this committee to study have a fundamental place in the communities of the United States. They furnish the very requisites of business activity and of community life—heat, light, industrial power and local transportation. The dependence of our towns and cities upon these public services for all the processes of production and distribution, as well as for the activities of modern daily life, is so complete that the national welfare is at stake when a condition which threatens entire paralysis spreads throughout the units of any of these utilities.

"Such a condition inimical to the whole public now exists as to street railways. The emergency is so immediate that the committee at once makes this report with respect to street railways.

"Subject to peculiar limitations which do not apply to the same extent in the regulation of other utilities, street railways have been unable to increase their income to conform with the growth of their expenditures. Private industries have found a way to increase prices to meet their increased costs for wages and materials and changed conditions of credit. Public utilities do not possess this freedom of action. This has developed a critical situation in the street railway industry.

"This problem is common to every community in all parts of the country and therefore has become national in importance. It is a most urgent problem of the readjustment period. The danger increases day by day. In March 10 per cent of the mileage of the street railways of the country was in the hands of receivers. By the middle of April the proportion had already increased to 12½ per cent. Furthermore, many companies not yet formally declared bankrupt are in fact insolvent when gaged by any ordinary business standard.

"Wholly apart from the interests of street railway companies themselves, such a situation threatens disaster to every community. It means that a public service around which homes and industries have been built lacks means to provide the service which these communities require for their daily life. It means, too, that employers of a large body of workers cannot without relief continue to pay an adequate wage in a period of great increase in the cost of living. It means also that some of the largest users of the products of manufacture are without the ability to make purchases necessary to their maintenance and extension at a time when such purchases are vital to the resumption of our manufacturing industries.

"To your committee it appears that the time has come for a thorough examination of the functions of street railways, of the relations street railways bear to the public, and of the measures which should be adopted to guarantee the public an adequate service. An entire reconsideration is needed. In such a re-examination it may appear that a remedy is not to be found merely in an increase in fare, but that there may be other ways of reaching a solution of the problem.

"Whatever the causes leading up to present conditions, the remedy can now be found only if there is a widespread knowledge respecting the proper relations between street railways and the communities they are called to serve. At present there is no such general information and understanding of these problems which affect the daily life of every citizen, whether he be an employer or an employee, a merchant or a manufacturer, a city resident or a dweller in a suburban home.

"Upon considering the importance of this subject, and ascertaining the circumstances which we have attempted to suggest briefly in outline, we have concluded to present to you three recommendations in contemplation of the immediate action which is necessitated by the emergency:

"1. This committee should be continued and authorized to hold hearings at which it may invite information and suggestion from persons representing different interests and diverse points of view and who can contribute toward solution of the problem.

"2. After holding hearings and completing studies as expeditiously as possible, this committee should be authorized to present to the board of directors a report setting out recommendations with respect to the principles which should be adopted in undertaking to solve the street railway problem; this report might then serve as the basis for a referendum vote among all the organizations in the membership of the Chamber of Commerce of the United States.

"3. Meanwhile, organizations in the membership of the Chamber of Commerce of the United States should be requested to co-operate with this committee in developing information which the committee may need in reaching its conclusions."

### ADDRESSES ON TUESDAY AFTERNOON

The Public Utilities Group held its first meeting on Tuesday afternoon at the Missouri Athletic Club. Lewis E. Pierson, chairman committee on public utilities, Chamber of Commerce of the United States, presided and explained that at the meeting on Wednesday afternoon the committee would be glad to hear from any persons interested in the subject, or to receive any questions which any person might desire to hand in. He then introduced as the first speaker Samuel W. Fordyce, Jr., St. Louis, Mo., former counsel of the War Finance Corporation.

Mr. Fordyce first gave a brief history of the work of the War Finance Corporation, so far as it related to electric railways. He said that much had been expected of the corporation when its organization was first announced, but a closer inspection of the act showed that public utilities could take advantage of it only under Section 9 and had (1) to prove that they were unable to get funds through the regular banking channels or from the public and then (2) they had to give adequate security for the loan. The former was not difficult, but the latter was a stumbling block. The value had been there, but it had gone. The corporation made some loans, but several of the companies to which it had made these loans had since gone into the hands of receivers, like the properties in Brooklyn, St. Louis and New Orleans. Under the law, bankers could also borrow to assist utilities, but the conditions were so arduous as practically to preclude this assistance. The thought was then considered of organizing a banking corporation with $100,000,000 capital, but as it was held that this corporation could not lend more than 50 per cent of its capital to one industry, a system of a group of banks was considered. The armistice ended this work.

From his experience gained with this corporation Mr. Fordyce had concluded that the street railways were "broke" and had been for some time, and he did not think that any extended financing could be done. Every economy had been put into effect and he did not consider that over-capitalization was the cause. Help must now come from the outside, but it was questionable how far utilities could compete in the sale of their bonds with municipal and government bonds. For the large lenders, the tax exemptions features of the government securities made a strong appeal so that the utilities could compete only for the loans of those with small means. He believed a possible solution would be a congressional act by which utility bonds would be put on the same basis of tax exemption as municipal bonds. This is one way in which the federal government could help, as the United States now has no power to fix rates. The conditions of the last few years have shown the necessity of a flexible rate and that could be granted only by the municipal or state bodies. During the war the corporation had made a loan to the New Orleans property with the provision that a 6-cent fare should be granted but had been unsuccessful in similar interviews with the officials of other cities. Another effort of the corporation had been to persuade present holders to renew their loans in whole or in part on maturing issues, but this had been successful only in part. He said that the corporation had received very few applications from companies using hydroelectric power.

He thought it would be very helpful if the President would appoint a commission containing representatives of the Departments of Commerce, Labor and the Treasury, the utility commissioners, the mayors and the railway owners, with power to make an investigation into the causes of the present conditions. Findings from such a commission could be used with municipalities to prove to them that the situation was of national importance and also to destroy the psychology of the nickel. This he suggested as preparatory to a possible change in the income tax law. He also suggested that if the War Finance Corporation could be continued as a peace agency it would be helpful, although this could be accomplished only by congressional act. The only other alternative was to sell out to the municipality.

In answer to a question, he said that the service-at-cost plan was a good one, but it took time to work it out and would not meet the present situation. He referred to the extensive holdings of utility securities by insurance companies, savings banks and other investing institutions as emphasizing the importance of national action.

### TELEGRAM FROM INVESTMENT BANKERS

At the close of Mr. Fordyce's address, the chairman read a telegram received by the committee from William G. Baker, Jr., president of the Investment Bankers' Association of America. After regretting that it was impossible for the association to have a representative present at the meeting, Mr. Baker said: "So that your body may be advised as to the position of our association on the problems confronting the street railways, I would advise that we have recommended to the Department of Labor the early appointment by the President of a federal board on street railway conditions, on which there would be representatives of the United States Department of Labor and other interested departments of the government, of the street railway companies, of the American Bankers' Association, of the Investment Bankers' Association of America, of the Chamber of Commerce of the United States, and of the National Association of Public Utility Commissioners, with adequate statistical and clerical assistants, for the investigation of the facts concerning street railways and the reasons for their present condition, and with instructions to state the principles which should govern the proper relations between the street railways, their employees, the car riders and the public generally, in order that the people may have adequate transportation at fair rates, the rights of the people may be fully protected, the investors in street railways may be protected against loss and new capital may be provided to meet the increasing demands upon the transportation systems in the interest of industrial growth of the communities served and the health and welfare of urban populations."

After the appointment of a committee on resolutions, Chairman Pierson introduced the next speaker, Hon. William D. B. Ainey, chairman Public Service Commission of Pennsylvania. An abstract of his paper will be found elsewhere in this issue.

### ADDRESS BY MR. WADE AND RESOLUTIONS

The final speaker was Festus J. Wade, president Mercantile Trust Company, St. Louis, who said that forty-two years ago he had been a driver on a bobtail street car when a "long" day consisted of eighteen hours and a short day of "twelve" hours and his daily wage was $1.75. He criticized the early financial history of many of the electric roads and believed that because of it the investors had lost faith. He thought that the employees could be a great help in explaining the present situation to the public. He also suggested that railway mortgages should provide a fund by which they would be retired within a reasonable term of years. He also suggested the distribution in the cars of leaflets to patrons telling about the existing railway problems. In answer to an objection that his plan of amortization would cast the burden of amortizing the property on the present riders, he thought that the plan would make up to some extent for allowances for depreciation. In a reply to an inquiry as to whether valuations did not overcome the criticism of overcapitalization, he believed that rates based on a fair valuation were proper.

At the conclusion of Mr. Wade's remarks the committee on resolutions of the public utility group drafted a set of resolutions which under the procedure of the Chamber were duly submitted to the main committee on resolutions.

### ELECTRIC RAILWAY FACTS ARE PRESENTED

The proceedings on Wednesday afternoon took the form of a hearing at which all of the members of the Public Utility Committee of the Chamber of Commerce presided. Those who presented extended evidence included Harlow C. Clark of the American Electric Railway Association staff; R. A. Leussler, general manager Omaha & Council Bluffs Street Railway; Ralph S. Bauer, of Lynn, Mass.; a banker from Seattle, Wash.; a member of a city improvement association in St. Paul, Minn., and A. L. Faber of the Westinghouse Electric & Manufacturing Company. Walter A. Draper, Cincinnati, Ohio; Horace Lowry, Minneapolis, Minn., and H. H. Crowell, Grand Rapids, Mich., also spoke. The testimony brought out the necessity of greater income for the electric lines. A more extended report of this hearing will be published next week.

### CHAMBER PASSES IMPORTANT RESOLUTION

On Thursday morning the full Chamber unanimously adopted the following resolution presented by its committee, as referred to above in the report of the Tuesday session:

"Street and interurban railways have such a fundamental place in all important communities, and conditions of war have disclosed such acute situations in the affairs of this class of public utilities that the Chamber's committee on public utilities should proceed with its hearings and studies to the end that it may soon place before the board of directors a report with commendations respecting the procedure which should be followed to place these important facilities upon a basis which will assure their efficient service."

At the Thursday session, which closed at one o'clock instead of the end of the afternoon, as planned, P. H. Gadsden was elected a director of the Chamber from Charleston, S. C., and Lewis E. Pierson was re-elected a director.

# Railways Cannot Afford to Lose Riders*

## No More Fruitful Subject for Local Study Than That of "Selling" Rides Along Modern Merchandising Lines — Operating Improvements Should Not Be Ignored

BY WILLIAM D. B. AINEY

Chairman Pennsylvania Public Service Commission

I CONFESS to a deep interest in the problems confronting electric railways. It is not that I am armed with an answer satisfactory to myself that leads me to speak now. If I shall succeed in giving assurance that I approach these problems sympathetically, that I am cognizant of their serious character and that as a member of one of the state regulatory bodies I earnestly desire to render helpful assistance to the railway interests of my State, I shall have established in part, at least, a working basis justifying my address.

We can agree that the soaring costs of labor and materials have imposed a heavy additional burden upon the revenues of electric railways, and that this has occurred simultaneously with the closing of the ordinary avenues of credit, financing thus being made difficult if not impossible. Net earnings have often disappeared between the upper and lower millstones of a most serious situation. That this has caused these companies grave anxiety of mind and perturbation of spirit was and is a necessary consequence of these conditions.

We are informed that the operating returns for electric railways for 1918, as compared with 1917, showed an increase of but 6.45 per cent, while the expenses for the same period increased 16 per cent. In December, 1918, their operating expenses had increased 23 per cent over the same month in 1917, with a resultant falling off in net revenues of 4 per cent. These figures are without doubt startling.

The accentuation is no less when we remember that these figures cover a period when many railways had increased their fares from 5 to 6, 7, 8 and in some instances 10 cents. So largely do these increased rates enter into the computation just submitted that thoughtful people are beginning to doubt whether, in general, these fare increases will give the relief which the companies must have.

### PARTICULAR CASES MUST BE STUDIED

I venture now the suggestion that there is no general answer to be found applicable to all companies, to all localities and to all operating conditions. The sooner we get away from too much generalization and devote our time to the study of particular cases, the quicker we shall find our separate answers, when satisfactory answers are possible.

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*Abstract of address presented before the public utility group of the United States Chamber of Commerce, St. Louis, April 29, 1919.

If our minds are to pursue the channels of right and logical thinking, we are bound to recognize the truth of the following:

First: That electric railway service, particularly urban service, differs fundamentally from that of railroads, and certainly from all water, gas, etc., utilities It is a service in which a large share of the customers have the right of election as to whether they will walk or ride, with the jitney and automobile as alternatives. Railroads are not so subject. There is then a much closer relationship between the rate of fare and the riding habit than is found with other forms of transportation. The revenues of electric railways are to a very appreciable extent dependent upon a public willing to pay the imposed rates.

Second: To speak particularly of Pennsylvania, no two companies have the same corporate history. In rare instances have their lines been constructed under similar conditions. There are wide differences when we consider the localities served. There are topographical and geographical variants and differences with respect to congestion of population, and even with respect to the riding habits of particular localities.

When the people of Scranton oppose an 8-cent fare, they are likely to point to Philadelphia with a 5-cent rate; when the Pittsburgh company desires a 7-cent rate, it is easy to point to Boston. It is neither logical nor scientific to predicate a rate schedule upon such comparisons, unless the conditions are shown to be similar, and they are rarely comparable. If there ever was a time when each electric railway needs the most careful self-analysis, it is now.

### RATE OF FARE SHOULD ATTRACT TRAFFIC

There are certain essential factors to be considered. In the first place, there is an intimate relation between the fare and the riding habit. I am sure we are agreed that the public is entitled to receive adequate service at a rate generously sufficient to meet operating expenses, provide a reserve for depreciation and yield a fair return. You might be inclined to state the proposition conversely, but the result would be the same.

We might place the primary emphasis on service and you upon revenues. Either is correct unless the other is ignored. Here, then, is a fair balance which we must strive to maintain. A rate of fare should be high enough to provide adequately for the company's needs and low enough to attract car riders to produce that revenue. The over or under emphasis of either of these postulates distorts the vision and disturbs accurate thinking. A rate of fare so high as to cut off a material part of the patronage will result ultimately in disaster to a company just as certainly, if not so immediately, as a rate of fare too low to produce the required revenue.

### SOME CHOSE "THE EASIEST WAY"

In many instances a higher fare to provide increased revenues has been prescribed, based upon a purely mathematical hypothesis, ignoring the psychological and other considerations which enter very largely into the question as to whether it would be paid by the car riders. The results have not followed arithmetic and have been serious and perhaps disheartening. May it not be that under the pressure of immediate necessity some companies have chosen the easy pathway of least resistance.

I cite you an instance. A company, with an annual riding patronage of approximately 29,000,000 two years ago, increased its rates from 5 cents to 8 cents with loss in car riders of at least 6,000,000 fares. A total of 23,000,000 riders at 8 cents yields slightly more than 26,000,000 at 7 cents, or 29,000,000 at 6¼ cents.

In one of our large cities a railway had an annual patronage of 263,000,000 carried at 5 cents. To increase its revenues it increased its fares to 5½ cents (two tickets for 11 cents), and shortly after readjusted its rates by establishing an inner zone in which it anticipated no increase in riding habit, but in which its studies predicted patronage on a 5-cent fare at the rate of 63,000,000 annually. An outer and overlapping zone was created, this containing industries from which an increase in riding habit might have been expected. There was applied to it a 7-cent rate applicable also to riders between the two zones. It was anticipated that there might be a falling off of 10 per cent from the total of 200,000,000 theretofore riding in it. Actual experience, over perhaps not sufficient length of time to furnish a conclusive answer, showed in the inner zone (5 cents), a material increase in riding (73,000,000 riders) per year, while in the 7-cent zone the loss exceeded that anticipated by sixteen to seventeen millions (163,000,000 riders).

The social, industrial, financial and economic wellbeing of our country is ineradicably interwoven with the prosperity of the electric railways. Hence I view with great anxiety any plan which results in a large proportion of the public ceasing to patronize these roads. Such a situation is not wholly different from that which would arise if merchants were to burn up 15 to 25 per cent of their stock of goods and attempt to recoup on the 75 to 85 per cent of goods remaining. Surely there is a sense in which the car riders in any community are the railway's "stock of merchandise." As the curve of loss in patronage heightens appreciably as the rate of fare mounts from 5 to 10 cents, we must determine as best we may in each locality where and when the danger point is reached.

### LACK OF MERCHANDISING IS INEXCUSABLE

In the second place, the old-time policy of electric railways was based upon the conclusion that the profits were in the fully loaded cars, but the modern conception seems to be a lessening of the number of car riders at an increased rate. The railways cannot afford to surrender these car riders. The success of the railway business is to be measured in terms of the retention of such riders.

Electric railways should give more attention to merchandising in order to increase the carriage of passengers. With car rides to sell, every empty seat is a potential loss. To my mind there is no more fruitful subject for local study than is involved in this suggestion. Why it is not more generally followed, I cannot conceive. That satisfactory results would flow from a judicious handling of the situation in this respect would seem to be as certain as the sequence between advertising and the sale of goods by merchants. To attract car riders, whereby the unfilled cars may be filled, is a business proposition which the electric railways cannot afford to ignore. How and when and where must be answered by each company in the light of local conditions and opportunities.

The value of public approval is a merchandising asset to the railway as it is to the business man. In a peculiar sense retailers are dependent upon the railways, and these merchants should possess sympathetic ears. But can their friendly interest be obtained when such large proportions of car riders are lost to them as potential customers? They are, however, in a very influential position in influencing, directly and indirectly, public sentiment. They have ready access to the newspapers, to whose success they materially contribute and which in turn mould the public opinion.

Local Chambers of Commerce, if they will investigate and fearlessly announce their views and positions, are in places of strategic importance in shaping that opinion. And if electric railways will unite with them on a policy which involves two propositions balanced against each other (retention, yes increase of car riders, and adequate revenues to meet each company's needs) much of the local difficulty will be removed.

It is true that railways have difficulties which merchants have not. But it is true, it is imperative, that railways should take, with wisdom, a page from the methods and experience of merchants and build up a part at least of their requisite increased revenues out of patrons now being lost to them and out of others which the growth of the country would under different circumstances probably provide.

### ZONING A FRUITFUL FIELD FOR STUDY IN LIGHT OF LOCAL CONDITIONS

It has come to my attention that one company is putting experts on the streets to observe the movements of the people and to devise methods of attracting passengers to the cars. To that end special tickets or commutation tickets are being considered.

The zoning problem, particularly in interurban service, is a fruitful field for local examination, but zones should be so arranged that car riders will be attracted rather than repelled. In some instances the present zones for single fare areas are entirely too long. I have noted one instance of 16 miles for a single fare. Whenever it costs more to carry a pasesnger than is paid by him, a burden is placed not only upon the company but upon other riders whose rates must be higher to make up the deficiency

It cannot be denied that a flat increase of fare loses the short distance rider and retains the rider whose ride is less remunerative, or perhaps not remunerative at all. The experiment of zoning with an initial rate for the first zone traveled and a less rate for each succeeding zone, has elements of justice and equality to support it. But here, too, the answer must be found in the light of local conditions, and not in the prescription of a uniform policy.

### DO NOT OVERLOOK OPERATING IMPROVEMENTS

I shall not undertake to speak specifically of operating studies, lighter cars, one-man cars, etc., but in the light of pressing conditions, such subjects cannot prudently be overlooked by operating officials of electric railways.

I am not at all convinced that we can afford to dispense with electric railway service. No other, better or more certain method of local passenger transportation has been devised. Such a service is entitled to have the fullest public support and to receive, at the hands of the public, revenues sufficient for its efficient maintenance.

I have not attempted to enunciate a commission policy, for I firmly believe that commission regulation cannot be a success or be of permanent public benefit if it interferes overmuch with the right of initiative which must and ought to be lodged with the utilities of the country.

The foregoing observations are those of one who from the outside has noted with some anxiety the trend of certain policies, and among them that increased rates of fare have not in all or in many instances resulted in anticipated increases in gross revenues. These observations relate more particularly to urban service, for the conditions surrounding suburban and interurban lines may approximate more closely to steam railroad than to electric railway problems.

### HINTS FOR THE WISE

Let me summarize:

(a) A rate of fare which seriously interferes with the riding constituency of any company will lead in the long run to financial ruin of that company.

(b) We cannot return too quickly to the former policy of building up increased revenues by resorting to the merchandising side of the business, whereby empty seats will be filled.

(c) Re-zoning in particular cases should be considered.

(d) Commutation tickets should be adopted where the results through the attraction of traffic at timely hours and to convenient localities would justify their use.

(e) Operating conditions should be studied and lighter cars or perhaps one-man cars be installed where conditions warrant.

Differences of opinion, honestly expressed, are not so antagonistic as formerly they were thought to be. They are but the triangulation of ideas. They represent merely the divergence of the view points upon which different observers stand. We have discovered that the man traveling due east and the one traveling due west ultimately meet. The meeting point in this place, I am sure, is that the wellbeing of the electric railways as efficient public servants, supported by adequate revenues without which they cannot continue that service, must be assured to them, and thus their service to the public.

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## Ambitious Japanese Electrification Project

Application has been made to the Japanese government for permission to construct a high-speed electric railway between Tokyo and Osaka, a distance of 287 miles. It is estimated that an expenditure of about $100,000,000 will be necessary for the purpose. The proposed line is about 69 miles shorter than the existing steam railroad. Doubt is expressed in Japan as to the willingness of the government to permit the construction of an electric line competing with its own steam line, but the promoters are counting on the changed commercial, financial and transportation conditions brought about by the war to cause the government to consider the project favorably.

# Side Lights on the Zone Fare—Car Capacity

### British Cars Have More Seats Than American Cars and Their Conductors Make a Much Larger Number of Collections per Car-Mile

BY WALTER JACKSON

THE statement that the practicability of zone fare collection in British cities is due to the use of small cars has been made so often that a great many people believe it. No later than this year it was gravely repeated in an admirable analysis of a fare situation. As nobody could have any ulterior motive in circulating a tale like this, it is probable that the misconception arose from the half knowledge that most British cars are of the single-truck type. The fact is that nearly all of these cars have two decks. It is only on the Continent that single-deck cars smaller than ours prevail.

So far from having a smaller seating capacity than American cars, the British cars are generally larger. This is what we ought to expect when we read that systems like Liverpool and Glasgow average sixteen to twenty passengers per car-mile. Even with their better all-day riding, one would hardly imagine that British tramways enjoyed anything like a 50 per cent load factor, which would have to be the case if their capacity ran only from thirty-two to forty seats. British cars actually have from fifty-six to seventy-eight seats each. The following comparison with large American city cars built during recent years tells the tale.

SEATING CAPACITY OF BRITISH AND AMERICAN CARS

| United Kingdom | | United States | |
|---|---|---|---|
| London County Council.... | 78 | Brooklyn Rapid Transit... | 58 |
| West Ham ............... | 78 | New York City Railways.. | 51 |
| Aberdeen ............... | 54 | Third Avenue Railway ... | 51 |
| Glasgow ................ | 62 | Youngstown ............. | 56 |
| Belfast ................ | 60 | Chicago ................ | 40 |
| Dublin ................. | 58 | Milwaukee .............. | 52 |
| Leeds .................. | 60 | Philadelphia ........... | 54 |
| Reading ................ | 72 | Allentown .............. | 57 |

As a further example it may be mentioned that the standard car suggested for the Edinburgh Tramways electrification would be a single-truck vehicle seating sixty people.

Nevertheless, it is probable that during the rush hours the American cars average a greater total seating and standing load than the British cars do. This does not mean that the British car has no room for standees, inasmuch as the lower deck is generally fitted with longitudinal seats. The paradox arises from the fact that as so much of the British riding is short haul, it is necessary to limit the number of standees. Short riders will not patronize heavily loaded cars. For example, although the seating capacity of the standard Glasgow car is sixty-two, the number of standees permitted in normal times is only six. In spite of this limitation Glasgow probably has the highest number of passengers per car mile in the world.

If the all-day load, rather than the peak load, is taken as the governing factor, British tramways are far more justified in their choice of large-capacity cars than are those of the United States and Canada. Actually, the double-deck car gives the required rush-hour reserve capacity at less cost in propelling surplus weight than do the "jumbos" in so many of our cities. However, it is not the reserve capacity feature of the double-deck car that is the topic in hand but rather the physical possibility of collecting graduated fares on such a car.

Several British operators hold the opinion that prepayment is "a consummation devoutly to be wished." It is readily apparent that the British double-deck car is handicapped for prepayment because so large a part of the platform is occupied by the stairway to the upper deck. The best that can be done is to request passengers who are proceeding to the upper deck to pay as they enter. This request has received additional emphasis since the coming of female conductors. Most of the fares, necessarily, are collected after the passenger takes his seat.

Practically all of these cars are of one general type, namely, the bodies have end doors but there are no vestibule doors. In recent years the upper deck has been inclosed in whole or in part, and sash has been added over the dashers. Since the platforms are open, the step accident is still a prominent feature in operation.

The first question asked about the zone fare is: Does the conductor get all of the fares? Of course, he is bound to miss some fares, but such oversights are minimized by the rule that each passenger must be prepared to show to either the conductor or the ticket inspector a receipt for fare paid on the current trip. The possibilities of the zone fare can best be appreciated from the amount of revenue collected for the treasury from a given number of passengers per car-mile. For example, in the year 1918 the conductors of Liverpool turned over an average of 18.91d. (38 cents) for every car-mile operated. This corresponded to an average of sixteen passengers per car-mile, 80 per cent of whom paid the minimum fare of 1d. During the 1918-1919 Christmas and New Year holidays the conductors on some lines of the West Ham Corporation Tramways turned in as high as 24.86d. (more than 49 cents) per car-mile from a traffic of twenty passengers per car-mile. On the Paisley Road and Alexandra Park line in Glasgow, conductors average almost twenty-three fare collections per car-mile!

If it is possible for a British conductor to carry on so many fare transactions per car-mile, American operators with their more convenient single-deck, big platform cars should have little to fear. A short-distance fare is far more likely to increase the off-peak hour traffic than the rush-hour traffic. If the peak-hour cars are already filled with regular long-distance riders, they will not attract anybody who has the choice of walking. During the much larger number of off hours the case is different. It is then that many short riders can be added without putting an extra burden upon the conductor; and this can be done also without adding any cars, if a short headway service is already in vogue. It follows that in comparing the great difference in passengers per car-mile here and abroad, allowance must be made for two things—first, that the average ride in Great Britain is shorter; second, that the loading on British tramways during off-peak hours is more favorable than here.

To conclude; there is certainly no truth in the assumption that the zone fare has proved workable in the United Kingdom because British cars are smaller than our own. On the contrary, their seating capacity is nearly always greater and their conductors must carry on a greater number of fare collections per car-mile than under the universal fare system. Hence, if British street railways have made the zone fare workable, American roads ought to be able to do still better in adapting either prepayment or postpayment to the roomier platforms and aisles of our cars. The will will find the way.

# Regulation with Teeth

## British Columbia Has New Law Providing Unusual Means for Enforcing Orders

THE public utility act recently passed by the Legislative Assembly of the Province of British Columbia possesses several novel features. Not only is the regulatory work centralized in one commissioner, appointed by the lieutenant-governor in council for a period of ten years, but the commission has unusual power of regulation and enforcement.

### FULL CONTROL OVER RATES

No mention will be made of the customary powers of the commission over the issuance of securities, amalgamation, sales, supervision over track connections and service in general. With regard to rate making, however, it may be pointed out that except by the direction of the commission or with its approval first obtained, no utility may establish any new rates, and every change in rate shall come into force only on a date fixed by the commission. The power of the commission over rates applies whether they are fixed by or subject to an agreement or otherwise and whether the agreement has been incorporated in or made binding by any general or special legislative act or otherwise.

In fixing rates the commission is required to have due regard, among other things, to giving the utility a fair and reasonable return upon "the appraised value of the property" and to the protection of the public from rates that are excessive as being more than a fair and reasonable charge for service of the nature and quality furnished by the company. The commission must consider all matters proper to be considered as affecting the rate, including the circumstances existing at the time any former rate was made or fixed as well as the circumstances existing at the time of the inquiry. In any case where the commission deems it expedient, it may make the alteration or continuance of any rate conditional upon the performance of some particular act.

Pending the determination of a fare for the British Columbia Electric Railway in Vancouver, the act requires the company from April 9, 1919, to keep in trust the amount of fare charged above 5 cents but not exceeding 6 cents. If the rate fixed by the commission is less than the rate charged during the period, the excess must be paid by the company to the Vancouver General Hospital, any remaining amount going to the company. If the rate fixed by the commission exceeds the rate charged during the period, then the whole of the amount collected shall go to the company.

In regard to appraisals the act states that the commission may "inquire into every fact which in its judgment has any bearing upon value, including the condition and value of the undertaking as a going concern and the amount of money actually and reasonably expended in that undertaking in order to furnish service reasonably adequate to the requirements of the community served as that community exists at the time of the appraisal."

### POWER OVER SERVICE AND DEPRECIATION

The commission has general power over service, and it may make regulations prescribing the conditions for all agreements entered into by companies in respect to service. The commission is given power to order "reasonable and expedient" extensions within municipalities and to apportion the cost as it deems equitable, and to order extensions generally in cases where it believes that sufficient business exists to justify construction and maintenance of the extension and that the financial condition of the company reasonably warrants the expenditure.

Whenever the commission after inquiry considers that it is necessary and reasonable that a depreciation account should be carried for the protection of security holders and creditors, it may order a company to keep an adequate depreciation account. The commission shall from time to time after inquiry fix proper and adequate rates for depreciation sufficient to provide the amounts required in addition to the expenditures made for maintenance.

The utility shall conform its depreciation account to rates fixed by the commission and shall set aside all money of this character in a depreciation fund, the income from which shall be added to the fund. The depreciation fund shall not be expended except for depreciation, improvements, new construction, extensions or additions.

Where the commission is of the opinion that the appointment of a supervisor or inspector is necessary and expedient for the purpose of supervising or inspecting, continuously or otherwise, the property or service of any company with a view to prescribing and carrying out measures for the safety of the public and the patrons or for the adequacy of service, the commission may appoint a supervisor or inspector over the company and prescribe his duties. The amount of his salary and expenses may be placed upon the municipality served or apportioned in such manner as the commission deems proper.

### ORDERS CAN BE ENFORCED

Three direct means of enforcing its orders are given to the commission. In the first place, the commission may forcibly or otherwise seize and take possession of the whole or any part of the property of any company and manage the business in the interest of the security holders, the creditors and the public, exercising all functions of the directors and officers until its orders have ben enforced. In the second place, any order made by the commission may be made an order of the Supreme Court through certification and filing and shall be enforceable in like manner as any order or judgment of that court. In the third place, when it is believed that no effectual means exists for compelling a company to comply with its orders, the commission may transmit to the attorney general a certificate setting forth the default of the company. Upon publication in the official bulletin of a public notice regarding the receipt of this certificate by the attorney general, the default of the company so established is ground for an action to dissolve the company.

The finding of the commission upon any question of fact within its jurisdiction, of course, is binding upon all parties and in all courts, but an appeal to a judge of the Court of Appeal may be taken upon any question as to law or jurisdiction. A stay of any order may be granted during the pendency of the appeal. The act contains three pages of detailed penalties running from $20 to $1000 for a single day's refusal to obey orders making of false returns, willful default in giving information and general violations.

# Comparative Census Data for Electric Railways

THE table below divides geographically the 1912 and 1917 census figures published in the ELECTRIC RAILWAY JOURNAL of April 26, 1919. Inasmuch as the table is in preliminary form, having been prepared from the tentative 1917 returns for individual states and from the unadjusted totals of the 1912 census report, no extended analysis seems advisable now.

The percentage changes in the data, however, seem to indicate that the largest growth in single track, cars and power output was in the West North Central and West South Central sections. Wages generally increased more rapidly than employees, to the least degree in the Mountain section. The passenger gains were heavier in the East than in the West; the car miles, *vice versa*.

In all sections the operating expenses increased faster than the gross income, and in the West and the South this was true of income deductions. The best showing financially was made by the South Atlantic States, and the worst by the New England, Mountain and Pacific groups. The effect of jitney competition in these latter sections is thus visible. The state groupings follow:

*New England*: Me., New Hamp., Vt., Mass., R. I., Conn.; *Middle Atlantic*: N. Y., N. J., Penn.; *East North Central*: Ohio, Ind., Ill., Mich., Wis.; *West North Central*: Minn., Ia., Mo., N. D., S. D. Nebr., Kan.; *South Atlantic*: Del., Md., D. C., Va., W. Va., N. C., S. C., Ga., Fla.; *East South Central*: Ky., Tenn., Ala., Miss.; *West South Central*: Ark., La., Okla., Tex.; *Mountain*: Mont., Col., New Mex., Ariz., Idaho, Wyo., Nev., Utah.; *Pacific*: Wash., Ore., Cal.

GEOGRAPHICAL DISTRIBUTION OF 1917 AND 1912 CENSUS STATISTICS FOR ELECTRIC RAILWAYS IN UNITED STATES

(1917 Figures in Roman; 1912 Figures in Italics)

| | New England | Middle Atlantic | East North Central | West North Central | South Atlantic | East South Central | West South Central | Mountain | Pacific | United States |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of companies.... | 114 | 515 | 255 | 90 | 109 | 50 | 70 | 40 | 66 | *1,309 |
| | *119* | *436* | *253* | *90* | *123* | *46* | *83* | *42* | *68* | *1,260* |
| Operating............ | 86 | 241 | 225 | 85 | 94 | 49 | 68 | 39 | 60 | 947 |
| | *91* | *246* | *222* | *85* | *107* | *45* | *79* | *40* | *60* | *975* |
| Lessor................ | 28 | 274 | 30 | 5 | 15 | 1 | [illegible] | 1 | 6 | *362 |
| | *28* | *190* | *31* | *5* | *16* | *1* | *4* | *2* | *8* | *285* |
| Miles of line........... | 4,345.91 | 7,203.73 | 9,650.17 | 2,527.11 | 2,397.39 | 1,073.47 | 1,338.23 | 963.26 | 3,058.34 | *32,557.61 |
| | *4,216.26* | *6,980.09* | *9,170.53* | *2,129.73* | *2,199.21* | *948.45* | *1,105.62* | *793.96* | *2,894.01* | *30,437.86* |
| Miles of single track..... | 5,558.19 | 10,548.41 | 12,670.86 | 3,665.42 | 3,277.86 | 1,450.20 | 1,682.37 | 1,301.30 | 4,689.64 | *44,844.25 |
| | *5,294.55* | *10,043.03* | *11,809.69* | *3,098.62* | *2,962.28* | *1,287.26* | *1,376.23* | *1,007.32* | *4,185.84* | *41,064.82* |
| Cars.................. | 14,232 | 31,196 | 24,069 | 9,484 | 7,387 | 2,725 | 2,895 | 1,673 | 8,942 | 102,603 |
| | *13,845* | *30,507* | *21,686* | *6,405* | *6,923* | *2,675* | *2,493* | *1,526* | *7,956* | *94,016* |
| Passenger............. | 11,800 | 27,278 | 17,452 | 5,793 | 6,277 | 2,317 | 2,518 | 1,163 | 5,316 | 79,914 |
| | *11,618* | *26,821* | *16,286* | *5,291* | *6,061* | *2,286* | *2,246* | *1,064* | *4,489* | *76,162* |
| All other.............. | 2,432 | 3,918 | 6,617 | 3,691 | 1,110 | 408 | 377 | 510 | 3,626 | 22,689 |
| | *2,227* | *3,686* | *5,400* | *1,114* | *862* | *389* | *247* | *462* | *3,467* | *17,854* |
| Electric locomotives..... | 21 | 38 | 62 | 51 | 22 | [illegible] | [illegible] | 22 | 130 | *358 |
| | *22* | *39* | *56* | *32* | *11* | *3* | *5* | *10* | *99* | *277* |
| Number of persons employed................ | 32,606 | 97,452 | 69,742 | 24,048 | 22,872 | 8,576 | 9,771 | 4,868 | 24,891 | 294,826 |
| | *34,224* | *93,811* | *66,721* | *20,930* | *19,958* | *9,375* | *8,393* | *4,498* | *24,551* | *282,461* |
| Salaries and wages....... | $31,600,948 | $87,460,013 | $65,252,535 | $21,028,682 | $17,600,864 | $6,509,520 | $7,805,552 | $4,496,608 | $25,485,640 | *$267,240,362 |
| | *23,285,975* | *66,387,065* | *47,607,646* | *15,986,008* | *12,501,028* | *5,824,724* | *5,717,503* | *3,997,836* | *19,583,154* | *200,890,939* |
| Total horsepower........ | 502,559 | 961,375 | 954,849 | 403,816 | 570,317 | 149,980 | 153,924 | 5,918 | 436,244 | *4,192,192 |
| | *421,888* | *977,703* | *824,707* | *327,470* | *382,924* | *138,607* | *111,236* | *91,938* | *388,578* | *†3,661,385* |
| Steam engines: | | | | | | | | | | |
| Number.............. | 253 | 361 | 467 | 155 | 206 | 90 | 108 | 27 | 77 | *1,744 |
| | *325* | *542* | *602* | *185* | [illegible] | *93* | *110* | *38* | *87* | **†2,258* |
| Horsepower........ | 457,893 | 935,663 | 921,954 | 373,391 | 368,597 | 149,980 | 152,324 | 56,264 | 120,139 | *3,536,205 |
| | *384,178* | *951,088* | *778,194* | *301,895* | *313,400* | *138,607* | *110,561* | *70,868* | *120,763* | *†3,165,888* |
| Internal combustion engines: | | | | | | | | | | |
| Number............ | 1 | 14 | 4 | 12 | 11 | ......... | 7 | 1 | ......... | *50 |
| | *5* | *21* | *6* | *8* | *6* | ......... | *2* | ......... | ......... | *48* |
| Horsepower........ | 100 | 5,330 | 4,250 | 5,925 | 10,335 | ......... | 1,600 | 464 | ......... | *28,004 |
| | *2,700* | *7,375* | *4,590* | *3,575* | *5,275* | ......... | *675* | ......... | ......... | *24,190* |
| Water wheels: | | | | | | | | | | |
| Number............ | 56 | 36 | 41 | 21 | 80 | ......... | ......... | 8 | 74 | 316 |
| | *52* | [illegible] | *67* | *48* | *87* | ......... | ......... | *19* | *74* | *383* |
| Horsepower........ | 44,566 | 20,382 | 28,645 | 24,500 | 191,385 | ......... | ......... | 2,400 | 316,105 | 627,983 |
| | *35,010* | *19,240* | *41,923* | *22,000* | *64,249* | ......... | ......... | *21,070* | *267,815* | *471,307* |
| Kilowatt capacity of dynamos................ | 354,845 | 706,917 | 653,920 | 297,619 | 393,983 | 109,505 | 109,996 | 40,435 | 268,240 | *2,935,460 |
| | *305,739* | *668,323* | *579,840* | *237,171* | *269,546* | *91,305* | *84,248* | *56,057* | *215,837* | †2,505,316 |
| Output of stations, kilowatt-hours............ | 806,862,258 | 1,672,355,678 | 1,775,205,270 | 677,668,614 | 842,368,045 | 203,465,858 | 305,539,270 | 99,754,432 | 857,283,364 | 7,240,502,789 |
| | *676,541,943* | *1,822,647,864* | *1,467,194,047* | *496,764,104* | *394,171,487* | *248,485,679* | *191,355,019* | *135,247,730* | *620,291,135* | †6,002,659,036 |
| Current purchased, kilowatt-hours............ | 193,076,125 | 1,632,794,419 | 1,430,410,881 | 275,527,139 | 423,096,706 | 207,868,700 | 70,449,880 | 82,155,833 | 631,958,359 | 4,947,338,042 |
| | *95,560,776* | *895,318,072* | *796,769,999* | *199,632,010* | *248,907,329* | *41,862,642* | *53,724,320* | *71,594,567* | *563,949,066* | *†3,017,358,753* |
| Passengers carried........ | 1,694,779,084 | 5,027,469,984 | 3,741,785,407 | 1,244,121,243 | 943,592,756 | 361,052,306 | 385,275,805 | 191,917,415 | 916,920,573 | 14,506,914,573 |
| | *1,380,035,701* | *4,125,221,246* | *2,968,575,745* | *1,063,762,274* | *791,277,464* | *342,143,945* | *330,702,628* | *185,383,120* | *948,239,593* | *12,135,341,716* |
| Revenue............. | 1,242,076,786 | 4,225,287,064 | 2,712,624,699 | 902,368,927 | 747,561,816 | 292,004,689 | 313,203,554 | 162,222,128 | 705,310,819 | *11,302,660,482 |
| | *1,051,161,737* | *3,513,720,591* | *2,159,620,746* | *787,301,146* | *616,724,741* | *268,785,533* | *270,745,675* | *154,224,248* | *723,270,250* | *9,545,554,667* |
| Transfer.............. | 434,239,701 | 761,951,265 | 952,503,426 | 334,299,693 | 184,691,325 | 62,642,847 | 65,519,964 | 26,734,632 | 187,291,574 | *3,009,874,427 |
| | *311,827,039* | *577,219,067* | *756,840,810* | *264,945,769* | *163,321,953* | *66,038,851* | *53,552,763* | *27,730,485* | *202,441,287* | *2,423,918,024* |
| Free.................. | 18,462,597 | 40,231,675 | 65,393,774 | 7,452,623 | 11,339,615 | 6,404,710 | 6,552,287 | 2,960,655 | 22,318,180 | 181,116,116 |
| | *17,046,925* | *34,281,588* | *52,114,189* | *11,515,359* | *11,230,770* | *7,319,561* | *6,404,190* | *3,428,387* | *22,528,056* | *165,869,025* |
| Revenue car mileage..... | 209,504,233 | 705,861,026 | 542,934,741 | 173,865,881 | 142,657,669 | 64,293,663 | 76,935,852 | 34,110,452 | 189,059,413 | 2,139,222,930 |
| | *191,451,066* | *663,588,817* | *474,239,256* | *152,346,875* | *124,591,004* | *58,056,424* | *61,616,556* | *30,149,835* | *165,580,241* | 1,921,620,074 |
| Railway operations—revenues................ | $68,804,330 | $230,354,775 | $162,091,962 | $52,734,834 | $42,426,736 | $15,882,474 | $20,276,724 | $10,617,288 | $48,091,991 | *$651,281,114 |
| | *55,440,449* | *190,690,069* | *128,042,006* | *43,140,584* | *32,556,965* | *14,420,129* | *15,549,746* | *8,486,312* | *47,669,862* | *535,996,122* |
| Auxiliary operations—revenues............. | 1,560,085 | 3,844,737 | 16,779,782 | 5,107,624 | 14,109,938 | 4,764,395 | 2,771,278 | 1,197,839 | 8,408,300 | *58,543,978 |
| | *1,074,634* | *986,755* | *7,233,153* | *1,740,740* | *6,901,540* | *2,664,354* | *1,480,764* | *2,616,307* | *6,817,335* | *31,515,582* |
| Non-operating income.... | 757,916 | 8,636,784 | 4,035,707 | 412,609 | 3,369,310 | 246,883 | 1,082,901 | 885,806 | 1,275,602 | *20,703,518 |
| | *907,934* | *6,362,082* | *3,985,314* | *297,899* | *1,910,462* | *477,776* | *1,823,251* | *848,117* | *1,805,978* | *18,418,813* |
| Income from all sources | $71,122,331 | $242,836,296 | $182,907,451 | $58,255,067 | $59,905,984 | $20,893,752 | $24,130,903 | $12,280,363 | $57,775,893 | $730,108,040 |
| | *57,423,017* | *198,038,906* | *139,260,473* | *45,179,223* | *41,368,967* | *17,562,259* | *18,853,761* | *11,950,736* | *56,293,175* | *585,930,517* |
| Operating expenses...... | $53,003,099 | $140,318,521 | $115,734,439 | $38,511,939 | $32,148,429 | $12,537,999 | $13,927,537 | $7,489,797 | $39,141,924 | *$452,813,684 |
| | *37,316,197* | *108,656,704* | *78,747,118* | *27,363,397* | *21,591,731* | *9,867,378* | *10,390,837* | *6,426,225* | *32,536,769* | *332,896,356* |
| Deductions from income (including taxes)...... | 16,237,757 | 84,062,232 | 48,660,431 | 14,217,822 | 18,440,255 | 6,438,489 | 6,636,163 | 4,371,483 | 21,768,517 | *220,833,149 |
| | *14,008,296* | *73,462,284* | *43,794,405* | *11,102,268* | *13,115,863* | *4,643,653* | *4,941,541* | *3,341,700* | *16,484,262* | *184,894,272* |
| Net income........... | $1,881,475 | $18,455,543 | $18,512,581 | $5,525,306 | $9,317,300 | $1,917,264 | $3,567,203 | $419,083 | ‡$3,134,548 | *$56,461,207 |
| | *6,098,524* | *15,919,918* | *16,718,950* | *6,713,558* | *6,661,373* | *3,051,228* | *3,521,383* | *2,182,811* | *7,272,144* | *68,139,889* |

* These totals, compiled from the preliminary individual state reports issued by the government, do not quite check with the totals presented in the government's own summary as shown in Table I in the *Electric Railway Journal* of April 26, owing probably to slight changes since the preliminary returns were issued.

† These totals as now given for 1912 represent slight readjustments of the divisional figures, taken from the 1912 census report. ‡ Deficit.

# Cleaning Twelve Cars a Day with Three Men

### The East St. Louis & Suburban Railway Accomplishes This Work by Means of Special Washing Equipment

CAR washing by the East St. Louis & Suburban Railway is a thorough-going operation. The work is done in a washing room containing two tracks of two-car capacity each. The equipment used to wash the outside of the cars includes a length of 1½-in. iron pipe extending along the full length of these tracks and at the height of the car roof. This pipe is perforated about every 4 in. with a $\frac{1}{16}$-in. hole. Each pipe is connected at one end to a main water line by a flexible joint, and a handle lever is provided so that the car washer can rotate the pipe to throw the stream against the side of the car at any desired height from the ground. The stream is, of course, started at the highest point on the car side, the washer scrubbing the side of the car with a long-handled brush and gradually working down the side to the bottom with both stream and brush. Each pipe is sectionalized by means of a valve in the middle so that either one car can be washed alone or two cars on each track can be washed simultaneously.

In addition to the outside cleaning the cars are washed inside from roof to floor, including seats, by means of a double hose line. Air is brought into the water line at 100 lb. pressure, both air and water being controlled at the nozzle. On the ceilings, seats, etc., much air and little water are used, giving a fine spray, sufficient for washing purposes without too thoroughly soaking the parts. On the floor and lower walls considerable quantities of water are used and the cars are flushed out as one would flush off a sidewalk.

The cars are washed according to mileage and just previous to inspection which for the city cars averages about every 1500 miles. They are run directly from the washing shed to the inspection pits.

The floor of the washing shed is of concrete and slopes toward the outer side of each rail. In order to prevent flooding of the rails, however, an abutment several inches high extends along the outside of each rail the full length of the track, and the water is conveyed to underdrains.

This washing plant has been in service about one year. Previous to its installation three men could thoroughly clean not more than four cars a day. Under the present arrangement an average of about twelve cars a day are thoroughly washed. With only three men working as at present not more than two cars are ever being cleaned simultaneously and as in general all three men work together on the same car.

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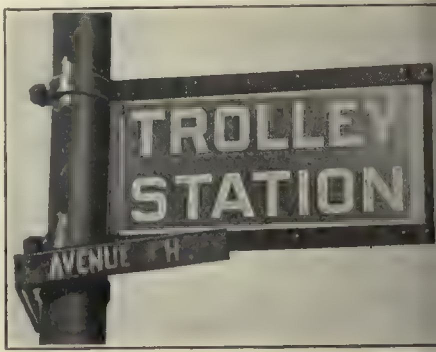
# Trolley Station Signs Used in Brooklyn

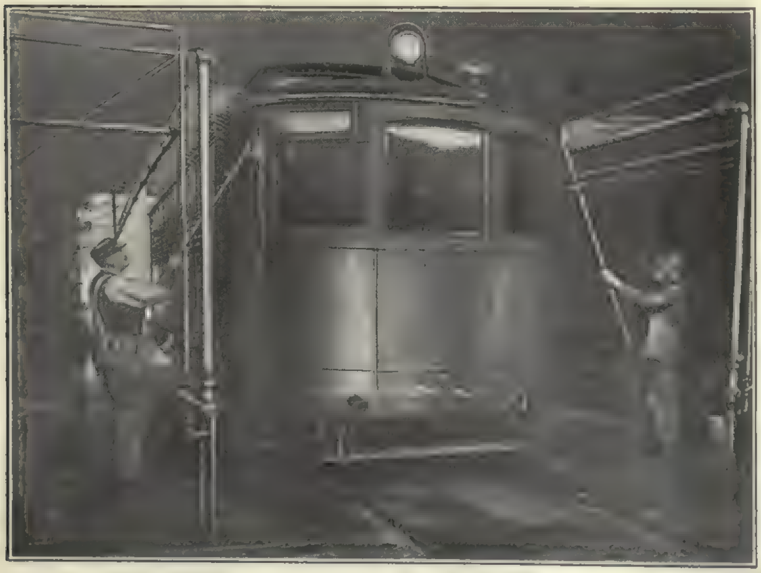
IN WALTER JACKSON'S article in the March issue of the ELECTRIC RAILWAY JOURNAL on the electric railways of Glasgow there was included a drawing of a trolley station sign used in that city. The drawing was complete enough so that anyone desiring to make up a similar sign could do so.

The accompanying illustration shows a sign used in Brooklyn for the same purpose which would seem to be just as pleasing to the eye and should be considerably cheaper to make if both signs are made in this country and under the same conditions. Only a single double-faced sign is required if the plan shown here is used, the sign being enameled and the letters white on a blue background. The dimensions of the Brooklyn sign are 18 in. x 36 in. and the sign is of No. 16 B. W. G. iron.

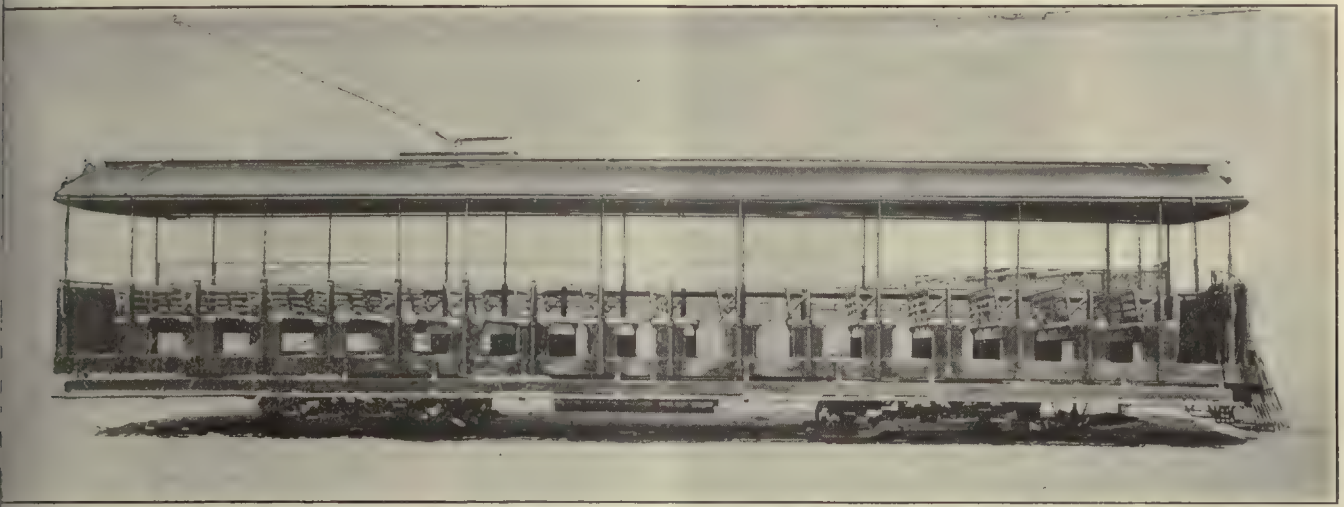


BROOKLYN TYPE OF TROLLEY STATION SIGN

Enameled signs of good quality are more expensive in first cost than are painted ones but they cost much less to maintain. Unless the enamel is chipped off by a blow, which is not likely to happen to such a sign, it is practically permanent and if the surface becomes dusty and dim it can always be freshened up by merely wiping off the dirt. And such attention is needed only at intervals of several years.



AT LEFT, WASHING CARS ON THE OUTSIDE WITH SPECIAL SPRINKLING SYSTEM AT EAST ST. LOUIS. AT RIGHT, METHOD OF CLEANING CAR INTERIORS



ONE OF THE OLD "MOONLIGHT" CARS

# Light Open Cars for Amusement Park Traffic

## United Railways of St. Louis Builds Type with Special Arrangement for Train Operation

THE term "moonlight car" in St. Louis has been handed down from the time when the company used to operate on pleasure trips and for special park traffic a type of car constructed with a canvas roof which could be rolled back. The fact is the canvas was seldom rolled back and later twenty cars—ten leaders and ten trailers—of similar construction were built with a permanent roof. Some time ago ten of these cars, nine trailers and one leader, were destroyed by fire and the company is now building ten new cars and making a few improvements over the older equipment.

The underframe construction consists of 8-in., 6½-lb. channel side sills, 3½-in. x 5½-in. wooden cross sills except over the trucks where 3¾-in. x 1⅞-in. wooden sills are used with 2½ in. x 1¼-in. x ¼-in. T-iron longitudinal members. The over-all length is 47 ft. 3 in. and the over-all width 7 ft. 10¼ in. In the new body design an 11-in. x ⅜-in. reinforcing plate has been added to each side beam by fastening a 4-in. x 3-in. x ⅜-in. angle to the base of the 8-in., 11¼-lb. channel. These plates extend practically the entire length of the car. Since the original cars were built Tomlinson couplers have been adopted as standard and this has necessitated some change from the original design. In addition to these changes the wheelbase has been increased from 22 ft. to 24 ft. 2 in. The weight of the car is 34,000 lb.

THE FIRST NEW CAR NEARLY COMPLETED

Views of one of the old cars and the first of the new ones nearing completion are shown. The seats are of wood construction throughout and the side posts are also of wood. Owing to the curvature of the front dasher it is necessary to shorten the first seat on the car for convenience of the passengers occupying this seat. The steps fold up and it will be noted that the cars are single end operated so that the left side is permanently closed and without steps. The arches supporting the roof are 1-in. iron pipe extending continuous from side to side. The roof is of wood covered with canvas with a footboard and trolley base support as shown. The two brackets at the lower edge of the end of the roof shown in the illustration are flag brackets.

These cars are equipped with United Railways No. 27 maximum traction trucks and two Westinghouse No. 56 motors. Ten of the cars have control equipment for operation either singly or as leaders in two-car trains, while the other ten can be used only as trailers in two-car operation. The leaders are equipped with K-35-W-2 control while the trailers have K-11-A control.

All cars are equipped with General Electric Company straight air brakes with an emergency feature and Golden Glow No. TR-128 headlights. The motor cars will seat ninety-six and the trail cars 100 passengers.

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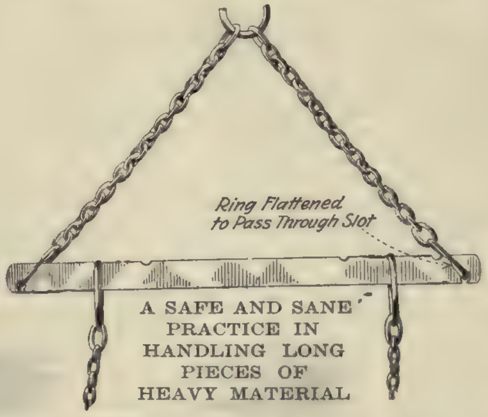
# Spreader for Use with Cranes

IN A RECENT executive series poster the National Safety Council advocates the use of a spreader of some such form as that shown in the accompanying sketch for use when lifting bars or other long material by means of a crane. Such work is dangerous with makeshift spreaders because the load is apt to fall if the spreader slips. This spreader is a one-piece steel bar designed so as not to require the use of bolts. It cannot become disengaged and the sling chains hang vertically from the notches in the spreader.



A SAFE AND SANE PRACTICE IN HANDLING LONG PIECES OF HEAVY MATERIAL

# LETTER TO THE EDITORS

## Anent the Stress on a Stranded Conductor Core

THE CONNECTICUT COMPANY
NEW HAVEN, CONN., Apr. 29, 1919.

To the Editors:

I am very much interested in the article by Paul A. B. Sahm on page 786 of the JOURNAL for Apr. 19, in which he raises the question as to whether the core of stranded wire is proportionately stressed and cites experiments to show that it is not.

Obviously, under the conditions of Mr. Sahm's example, namely, a core surrounded by tightly bound wires which do not change their relative position, the stresses in all wires will be substantially identical, but the question in my mind is, do these conditions obtain in the case of a long span? I am frank to say that I have never made any experiments to determine the facts. A test on a short section would probably show little variation, but there is a very general belief, emphasized by the use in a considerable number of large spans of a hemp-core cable, and in the American Telephone & Telegraph classification of strands the employment of the breaking strength of six wires for the rating, that in service conditions there is not that rigidity of relation assumed in Mr. Sahm's example. I am sure that all interested in line construction would be glad to learn from Mr. Sahm, or anyone else, of any actual tests which would establish the facts, whatever they may be.

CHARLES RUFUS HARTE,
Construction Engineer.

# AMERICAN ASSOCIATION NEWS

## Bureau of Information and Statistics

SECRETARY E. B. BURRITT has issued to member companies a statement of the activities of the Bureau of Information and Statistics which is now administered by J. W. Welsh, special engineer. After an introductory explanation he says:

> Among the more recent reports and compilations prepared by the bureau, since the March 1 report on this subject, are the following:
>
> *Table of Valuations of a Number of Electric Railway Properties,* based on appraised and negotiated valuations, and showing in general amount and kind of property included.
>
> *Rates of Insurance* covering workmen's compensation for all states conducting such business. Information has just been received showing in general the rates of insurance for the various classes of occupational risks involved in electric railway operation and construction.
>
> *Effect of Time in Fare Increase Cases on Percentage Increase in Revenue Obtained.* Information has been secured from a number of medium-size properties showing the comparative change in passengers carried and railway operating revenue received for a consecutive period of six months after changes in fare occurred showing the tendency to secure the theoretical rate as time advances.
>
> *Compensation for Carrying United States Mail.* At the request of the association, F. W. Doolittle has prepared a form of exhibit for the guidance of companies in presenting their testimonies at the regional hearings which will be conducted at various points in the country by the Interstate Commerce Commission commencing in Washington on June 9.
>
> *Cost of Injuries and Damages, Claim Department Expenses, Workmen's Compensation and Medical Bureaus.* Information from a number of typical companies has been secured showing the actual amounts of these items and their relation to the gross revenues.
>
> *Maintenance and Depreciation.* An analysis has been made based on reports of public utility commissions, special investigations of properties by consulting engineers and court decisions showing the charges made against operating expense covering maintenance on the one hand, and the amounts chargeable to a reserve fund covering depreciation on the other hand. In some recent cases these charges are fixed in the franchise agreements. In all cases, the authority and date of the determination are indicated.
>
> *Methods of Interurban Companies for Increasing Fares Whether by Shortening the Five-Cent Zones or Increasing Rates Per Mile or Otherwise.* This consists of a list of companies showing the present increased rates of fare for each of the above classes.
>
> *Increased Fare Situation.* The new rates of fare in all cities are shown in a very comprehensive compilation in which the cities have been grouped together on the basis of the rates of fare and giving also the name of the operating company, the former rate of fare and effective date of fare increase.
>
> *Effect of Increased Rates of Fare on Operating Revenues.* A tabulation of typical cities of over 100,000 population, having increased rates of fare and showing the effect of this increase on operating revenues compared with the theoretical expected increase. This is based upon replies received to letters sent out by the association during the last few months.
>
> *Income Accounts and Operating Expenses.* A comparative statement of the principal income accounts and operating expenses for a group of approximately 300 companies representing 84 per cent of the operating revenues of the country has been prepared.
>
> *Taxes and Other Requirements.* A compilation of approximately 150 companies showing a classified list of tax burdens and other requirements such as paving costs, bridge charges, public park and police expenses, etc., has been prepared. This is on a comparative basis for the years 1912 to 1916, inclusive.
>
> *Bulletin on Wages and Working Conditions of Trainmen.* The second edition of this bulletin covering about 300 companies summarizing the situation up to April 15, and including those companies formerly reported in edition No. 1 has just been issued. This is a very complete and comprehensive comparison by means of elaborate tables, showing wages, various working conditions and labor situations in various parts of the country classified on the basis of the miles of track of the operating companies.
>
> *One-Man Car Operation.* A questionnaire on the above subject has been sent out by the committee on one-man car operation of the Transportation & Traffic Association, and a very general response to this inquiry has been received. The association also has a corrected list of cities using one-man cars and it is in a position to furnish, in individual cases, the most recent statistics available regarding the operating economies of one-man cars on the basis of the above replies.
>
> *Skip-Stop Bulletin.* This is a printed compilation showing the skip-stop situation in a number of typical cities together with a statement of operating economies which have been secured by this means.

## Preliminary Work on Code of Traffic Principles

AS THE result of the meeting of the committee on code of traffic principles of the Traffic and Transportation Association, held in New York City on April 25, a program of work in connection with this subject was drawn up and the basis laid for outlining the essentials to be covered. The members present were H. E. Flowers, Baltimore, Md., chairman; A Gaboury, Montreal, Can.; P. E. Wilson, Cleveland, Ohio, and J. H. Stephens, Washington, D. C. L. H. Palmer, E. B. Burritt and J. W. Welsh also attended the meeting. The date for the next meeting was tentatively set for May 21.

# Recent Happenings in Great Britain

## Considerable New Work in Prospect—Railways Gradually Returning to Pre-War Basis

*(From Our Regular Correspondent)*

One of the absurdities of the present ituation in regard to motor omnibuses, and one which it may be hoped the proposed Ministry of Ways and Communications will end, was emphasized during March by the action of the London County Council. In the last two or three years before the war several town councils in England obtained permission to run motor omnibuses into areas outside the municipal boundary. When Parliament gave the authority it accompanied with it the condition that the municipality should pay to the outside local authority three-eighths of a penny per omnibus-mile run on the "outside" roads, this money being for road maintenance. Companies which run omnibuses, however, do not require any statutory powers to enable them to do so, and the opportunity to put a corresponding charge on them has not arisen except on one occasion. The exception was that when the Middlesex County Council obtained Parliamentary powers to construct a great new highway it succeeded in obtaining a clause authorizing such a charge to be made on any company running omnibuses on the new road. Owing to the war the latter, by the way, has not yet been built.

### OMNIBUS AUXILIARY TO TRAMWAY

The London County Council is now proposing to apply for powers to work omnibuses as an auxiliary to its tramways. The Council, however, unlike the municipalities throughout the country, are not the road authority in London. The councils of boroughs into which London is divided have the charge of maintaining the streets and roads. The highways committee of the County Council proposed that three-eighths of a penny per mile run shall be paid, partly, it would appear, to the borough councils and partly into the tramway funds. This proposal was opposed at a meeting of the Council, and it was withdrawn. When the bill comes before a Parliamentary committee the provision may, of course, be reinserted. Should that come about, agitation will arise for the London General Omnibus Company to pay a contribution for road maintenance.

A most interesting report has been presented to the London County Council on the shortage of cars and the difficulty of maintenance owing to the war. The present time-table requires 1244 electric cars (amounting with 20 per cent spares, to 1493 cars) and 114 trailers (amounting with 5 per cent spares, to 120 cars). On Feb. 20 only 1049 electric cars and 114 trailers were in service; there being, therefore, 195 electric cars short of immediate needs. The total numbers of cars held by the Council are 1662 electric cars and 158 trailers, so that the electric cars out of service for repairs exceed 600—approximately 40 per cent of the total number. The shortage from present time-table requirements has developed recently as a result principally of an unexpectedly large number of breakages of axles. During 1914—when the average number of cars in service was larger than now—only 127 axles broke. During the short period from Jan. 1 to Feb. 12, 1919, the number of axle breakages was 288. The rate was particularly high during the frosty weather, and the high average during this period is attributed partly to the overloading of cars under present conditions at times of heaviest traffic, and partly to the poor physical condition of the rolling stock, as a result of the heavy use to which it has been subjected over nearly five years—in which period abnormal conditions caused by the war have made it impossible to maintain the former high standard in connection with car repairs and renewals. If the promises made by the contractors are fulfilled, this condition will soon be relieved. During the war many cars have had to be depleted of available parts unobtainable from outside sources to replace broken or worn-out parts on service cars. All manufactures for civil purposes were practically discontinued during the war, except for munition purposes, but the making of malleable iron and steel castings and forgings is being resumed. As all undertakings are pressing for materials of this kind, deliver is slow.

It now seems probable that Edinburgh, the only tramway undertaking of any size in Britain which has not been electrified, will soon adopt the trolley system. More than twenty years ago, when other towns were electrifying their tramways, Edinburgh adopted the cable system, principally because it was felt that cable haulage was specially suitable for the heavy gradients in the city and because the city authorities were opposed to the overhead wires, and the conduit system had not been developed. Financially the undertaking has been successful, but the trouble with the cable system at junctions and the difficulty of extending it through the outer suburbs are drawbacks which have been keenly felt. The undertaking is owned by the city, but it has been worked on lease by a private company. The lease is now expiring, and soon the Town Council will take over the operation.

In view of these things, the municipality obtained reports by experts some time ago as to the future working and the recommendations were in favor of converting the system to electric traction. Another report is now issued, this time by R. S. Pilcher, recently appointed Edinburgh municipal tramway manager. Mr. Pilcher strongly favored the trolley system, and a committee of the Town Council has adopted his views. The question of the use of the conduit on Princes Street, often referred to as one of the finest thoroughfares in Europe, is still open for settlement. Mr. Pilcher favors the use of the overhead wires throughout.

### FAVORABLE UNDERGROUND REPORT

Lloyd George Hamilton, chairman of the Underground Electric Railways, London, presented a very favorable report at the annual meeting of the shareholders in March. The 6 per cent income bondholders receive 5 per cent. The Underground Company derives its revenue from the four underground railway companies, the omnibus company and other concerns, a large proportion of whose shares it holds. The improved position of the operating company is thus reflected in the accounts of the Underground Company. Apart from any question of nationalization or of strikes the operating companies, however, have difficult times to face owing to the accumulation of arrears of work during the war. The London General Omnibus Company needs to renew most of its vehicles, but it has large reserve funds which will help materially. The chairman warned the shareholders against haste in cutting reserves or raising fares.

### PROGRESS ON MINISTRY OF WAYS MEASURE

A good deal of the main opposition to the Ministry of Ways and Communications bill was eliminated during the debate on the second reading of the bill in the House of Commons on March 17 and 18. The proposal in the measure that the new Ministry should have power by means of orders in Council to buy up railways and other means of transportation was dropped. The result will be that when such steps are proposed the Government will have to carry bills through Parliament to authorize them. Another point made by Sir Eric Geddes (the Minister-designate) was that municipally-owned tramways are not to come within the scope of the bill. Sir Eric pointed out that municipal tramways on the whole are prosperous, their average earnings on capital being 7 per cent. He said nothing about company-owned tramways, but, according to the bill, they, like railways, are to be controlled by the Ministry. There is no doubt that during the committee stage of the bill there will be much opposition on details, and many changes will be proposed. But so far as the main principles are concerned it is significant that the second reading was agreed to without a division.

In the end of March a forty-eight hour working week, arranged after long negotiations, came into force on all British tramways. At the same date further increases of fares on the London underground railways and the London omnibuses were announced.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Down to Business

### Buffalo Appraisal Commission Told Local Railway Should Be Allowed a Return on $44,654,436

Evidence is being taken by the board of arbitration selected by the International Railway, Buffalo, N. Y., and the city of Buffalo to determine the valuation of the property of the company within the city to be used as a basis of an agreement between the company and the city whereby the International lines will be placed under municipal control.

It will probably take three weeks to hear the evidence. The board will then determine upon a figure upon which the company shall be allowed an 8 per cent return. As the result of a law passed by the State Legislature and approved by Mayor George S. Buck, the city and company will then enter into negotiations for a service-at-cost agreement in which a rate of fare will be specified. This agreement must be submitted to the voters for their approval.

#### ENGINEER WITNESS EXPLAINS

Among the witnesses already called by the railway is Jay H. Perkins of the United Gas & Electric Engineering Corporation, New York, consulting, contracting and operating engineer for the electric railways at Buffalo. Mr. Perkins placed the total figure upon which the International Railway should be allowed a return as $44,654,436. An analysis of these figures follow:

| | |
|---|---|
| Bare physical as of June 30, 1915 | $18,013,808 |
| Real estate, June 30, 1915 | 887,659 |
| Contractors' profit, June 30, 1915 | 1,211,035 |
| Stipulated as of June 30, 1915 | $20,112,502 |
| Capital additions as of June 30, 1915, to Dec. 31, 1918 | 2,562,550 |
| Stipulated as of Dec. 31, 1918 | $22,675,052 |
| Omissions and contingencies | 972,965 |
| Bare construction cost | $23,648,017 |
| Engineering and superintendence during construction | 647,854 |
| Law expenditures during construction | 98,283 |
| Injuries and damages during construction | 177,945 |
| Miscellaneous construction during construction | 187,519 |
| Taxes during construction | 119,636 |
| Interest during construction | 670,525 |
| Working capital not included in first item | 284,026 |
| Total fixed physical capital (including promotion and reorganization) | 2,075,845 |
| Superseded property | 2,764,125 |
| Total | $30,673,775 |
| Cost of financing | 612,475 |
| Going value | 8,612,750 |
| Capital entitled to return | $39,900,000 |
| Bond discount | 4,754,435 |
| Grand Total | $44,654,435 |

Under the caption of "A Suggestion to the Public," the *Service Spot Light*, the official organ of the railway, says:

> The company, by reason of financial burdens and lack of immediate funds, is in no position to back unreasonable claims. It follows then that the appraisal proceedings must partake of the nature of "triangular conciliation" if we may call it that. It must be the genuine effort of three men to meet an emergency equitably, justly, with intelligence and with fairness to all concerned. The city is in no mood to trifle or submit to methods that are outside the spirit of the present service-at-cost plan.

In explaining various items in the figures he submitted to the board, Mr. Perkins said that the going value of the company should be put at $12,000,000. Accumulated deficiencies, he placed at $8,000,000. Expenses of organization of the company, he said, totaled $900,000, and covered expenses of the Crosstown line, the Buffalo Street Railroad, the Buffalo West Side, the East Side lines and others which were absorbed in the organization of the International Railway. Expenses of consolidation were totaled at $500,000.

Newspaper readers of Buffalo are advised by the railway through the *Service Spot Light* as follows:

> From headlines and other articles—with the exception of editorials—do not draw wrong conclusions. We make an exception of editorials for this reason. Editorials are the medium through which newspapers speak their policy. Every newspaper is entitled to its own opinion in any public matter. Therefore, we exempt editorials.
>
> But from headlines and newspaper articles wrong inferences may be drawn. Remember the reporter writes, the editor edits and the headliner writes the headlines. Each performs to the best of his knowledge and ability. Yet, in a technical matter, like the appraisal of millions in property, errors, misconceptions and faulty judgment may creep in.
>
> For that reason we counsel you not to form judgment of the appraisal proceedings and their probable success or failure on what you glean from transient headlines.

## Commission Measure Passed in Michigan

Railway and public utility legislation for the session of the Legislature of Michigan of 1919 was reported to have been completed on April 25 by action of the House and Senate. Minor amendments to the Smith railroad and interurban rate bill were concurred in by the lower branch and the Upper accepted the House change in the Lemire-Wiley public utilities commission bill, making the commission consist of five members instead of three, and salaries $7,000 a year instead of $5,000.

The compromise utilities bill gives the new commission jurisdiction over every utility corporation in the State, except urban street railways. The railroad rate bill transfers control of interurban railways to the present State Railroad Commission, and the Lemire-Wiley bill transfers all power of the present commission to the new public utilities commission. The measures are now before the Governor.

## Relief Measures Killed

### Connecticut Legislature Votes Down Electric Railway Bills Recommended by State's Special Commission

The Senate of Connecticut on April 28 killed two of the most important measures planned to extend relief to the electric railways of the State and was reported to be ready to vote against the third. The measures defeated were the bridge payment and pavement payment reliefs included among the eight recommendations for legislation made by the special legislative commission appointed to investigate the condition of the carriers.

#### OTHER PROPOSALS LOST

The bridge proposition lost by a vote of twenty-three to eight. The pavement proposition was defeated by a vote of twenty-four to eight. Two members of the special commission, Senators Dillon and Hough, led almost alone the fight for the bills.

In the House the special commission had some little satisfaction. The bill to allow the Hartford & Springfield Street Railway to use the tracks of the steam line was passed without opposition. But as the measure is useless in the face of federal opposition, the action of the House was not of any account.

Finally, in the Senate, the finance committee came in with a majority report against the proposition to grant the electric railways relief from taxation for two years, the companies to pay but 5 per cent interest instead of 9 per cent, as everybody else pays for arrears. The unfavorable report on this bill is regarded as a death blow to the hopes of the special commission to get through one important measure, as it seems certain the Senate will support the committee's unfavorable report.

#### COMMISSION FINDINGS WERE FAVORABLE

The findings of the special legislative commission authorized to inquire into the status of the electric railways were summarized in the ELECTRIC RAILWAY JOURNAL for April 5, page 707. Following the presentation of the report of this commission, bills were introduced into the Legislature carrying out all the recommendations. In addition, an act was introduced providing that the State might lend not more than $2,000,000 to the electric railways, if necessary, and further providing for bond issues to raise the money, with the stipulation that the electric railways pay one-half of 1 per cent more interest to the State than the State would pay on the bonds.

# Washington Railway & Electric Explains

## President Ham Answers Questions Before Civic Bodies—Sees Zone Fares Ahead

The Washington Railway & Electric Company, Washington, D. C., advertised in the *Star* of that city recently suggesting a conference with representatives of civic bodies. The company said that its policy of publicity meant more than mere talk. In fact, said the company, "it means a willingness and a desire to furnish the public with full information concerning our affairs in order that they (the public) may act intelligently upon the problems confronting us." The company further said that it would be pleased to meet representatives of trade or civic associations and explain the facts and figures presented by it to the Public Utilities Commission during the recent hearing on its application for additional revenues.

### MEETING HELD APRIL 18

Acting upon this offer, W. B. Westlake, president of the Federation of Citizens' Associations, on April 11 asked that the board room in the District building be reserved on the evening of April 18 for a meeting under the auspices of the Federation of Citizens' Associations, at which representatives of the company were given a proper opportunity to furnish information to a gathering of representatives of civic organizations and others. Mr. Westlake, in communicating this information to W. F. Ham, president of the company, said:

> In my opinion this meeting should inaugurate a period of more cordial relations between your company and the public, which in this crisis is a most desirable thing to accomplish. There exists in the public mind a certain distrust and prejudice with regard to your company, which leads to intemperate discussion, and the purpose of the federation is entirely in line with its established policy of using its influence to expedite a just and fair conclusion in every matter affecting the relations between the people and the utility corporations.

Mr. Ham promptly accepted the invitation. Mr. Westlake then set about the matter in business-like fashion. With a view to expediting the work of the meeting he transmitted to Mr. Ham on April 16 a series of questions framed at a conference of representatives of the civic bodies and so drawn as to bring before the public meeting the information upon which to base an opinion. These questions were fifty-nine in number. Some typical questions taken from the list follow:

> Has the company during the past six years ever been penalized or fined for disobeying any order, rule or regulation made by the Public Utilities Commission?
>
> Does the company say it has furnished, and is now furnishing, the character of service required by said act of Congress?
>
> What reasons does the company assign for the seeming popularity in service and management of the Capital Traction Company over that of the Washington Railway & Electric Company?
>
> How can the people best co-operate with the company to secure "adequate, safe and reasonable service"?
>
> Could the District of Columbia be best served by one street railway company?
>
> Has the public been unreasonable in its attitude toward, or inordinate in its demands upon, the company?
>
> Do you consider that the capitalization of the Washington Railway & Electric Company represents actual value upon which the stockholders should receive dividends?
>
> If not, what amount do you consider does represent actual value?
>
> If the capitalization were reduced to an amount representing actual value as determined by a physical valuation fairly made and agreed to by the Public Utilities Commission and the company, and if a dividend of 7 per cent upon that capitalization were guaranteed by law, would not the road be upon a much better and more stable financial basis?
>
> Are you familiar with the principles of the so-called service-at-cost system which has been adopted in certain other cities?
>
> Do you know of any electric railway company which has put a zone system of fares into effect before trying an increase in the flat fare over 5 cents? This applies to city properties and not to companies which are chiefly or exclusively suburban or interurban.
>
> What guarantee will the company give as to increased service if its rates are increased?
>
> What were the strike losses in 1917?
>
> How many platform men have been in service of the company less than a year?
>
> How many in service more than five years?

At the meeting Mr. Ham said he was glad to submit to questions of every kind in a wholesome desire to bring about co-operation between his company and the public. He said he recognized the public as one of the three factors in railway operation, the other two being the employees and the investors in the property. Good service to the public, fair wages to employees, and reasonable returns to investors were all, he said, that fair-minded men desired.

HE'S homeward bound, HIS job gloriously done.

But WE are not through. We must go over the top again before we wear the smile of victory.

Our government has an unpaid balance of several billions of war debts. This is the foe we must "mop up."

We can't come out of our battle loaded with Hun helmets—but WE CAN and SHOULD come out of it loaded with notes of the

Victory Loan

Mr. Ham answered many of the questions which had been prepared in advance and also replied to many informal questions asked by citizens present in the audience.

The trend of the questions indicated the greatest hostility to a zone system for Washington. Mr. Ham said his company was not wholly committed to this plan, but owing to the difference in the financial conditions of the two competing companies in the District, he saw no other equitable method of authorizing the further revenue, which it was imperative his company should have, if it is to continue giving service to the public. Personally he believed that a zone system would become general in this country. It was the only way of measuring the service given.

President Westlake said the federation wished to get all the information possible that it might take proper action and make fair recommendations to the utilities commission.

### A BELATED CONCESSION

Earl Godwin, writing in the Washington *Times*, called the effort of the company "a concession that is a belated recognition of the rights of the people." He said in part:

> While this concession to voteless Washington would have been more valuable to the company if made two or three years ago, it is, nevertheless, a belated recognition of the fact that in the operation of public utilities the people generally have a most vital interest, not only in what they pay for the service they get, but the character of that service.
>
> The time has passed, never to return, when utility corporations may disregard the good-will of the public or rightful requests of their employees. So has the time gone when organizations of employees may run things their way without consideration for the public or the rights of their employers.
>
> While it is well to develop the past history of this company, the issue now is whether the company is entitled to further revenues. Money squandered in the past will not improve service now or in the future. However prejudiced the public may be over the bad record of the days gone by, it is perfectly willing to do justice. It wants to know for itself, though, just what all the facts are, so that it can measure the justice.

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# Overtime Pay an Issue

The City Council of Seattle, Wash., has under consideration the demand of the motormen and conductors on the Seattle Municipal Railway for overtime at a rate equal to one and a half times the regular wage. Members of the railway union are forcing the matter. The right to pay overtime has been recognized by other departments of the city government, and employees have been paid at the rate of time and a half, heads of departments stating that it has been necessary to do this to induce men to put in extra time. Corporation Counsel Walter F. Meier, in an opinion to the finance committee, states that the city has authority to pay overtime, holding that overtime may be paid employees on a day wage or monthly salary under such limitations as the City Council would deem advisable for the protection of the interests of the public.

# San Francisco Injunction Denied

## Supreme Court Upholds Paralleling of United Railroad's Lines But Leaves Open Without Prejudice Question of Damages

The United Railroads of San Francisco has lost its application before the United States Supreme Court for an injunction against municipal railway competition until damages are paid. The decision, however, leaves the company free to seek damages. The privately-owned company claims $6,870,130 of damages because of the construction of parallel outside tracks on Market Street and Church Street.

### CITY CAN COMPETE

In regard to the provision of the Civil Code of California that in no case must two railroad corporations use the same street for more than five blocks, the Supreme Court on April 21 held that this section of the code would seem to be a limitation of the powers conferred upon the Board of Supervisors by that and the adjoining sections, and not a contract by the State, or an authority to the board to contract, against a larger use of the streets. It most naturally is read as merely a general law declaring the present legislative policy of the State. (Wheeling & Belmont Bridge Company *vs.* Wheeling Bridge Company, 138 U. S. 287, 292; Williams *vs.* Wingo, 177 U. S. 601; Wisconsin & Michigan Railway *vs.* Powers, 191 U. S. 379, 387; San Jose-Los Gatos Interurban Railway *vs.* San Jose Railway, 156 Fed. Rep. 455, 458.)

But however this may be, the court continued, neither that section of the code nor the order of the Board of Supervisors granting the company's franchise purports in terms to prevent the city from itself establishing a parallel road. It is decided by Knoxville Water Company *vs.* Knoxville, 200 U. S. 22, that a covenant by a city not to grant to any other person or corporation a privilege similar to that granted to the covenantee does not restrict the city from itself exercising similar power, and it is assumed in that case that the principle already is established as to legislative grants. The city now is given power to establish and operate transportation service, and the United Railroads took the risk of judicial interpretation of its franchise and of this possible event.

### DAMAGE QUESTION LEFT OPEN

Therefore, the court concluded, so far as the harm to the company is an inevitable consequence of the city's doing what the former's franchise did not make it unlawful to do, the infliction of that harm is not a taking of the company's property that requires a resort to eminent domain. Regarding damages, the court then said:

> We understand that the municipal road now has been built, and the question is whether to retain the bill for a claim of damages. But as that would require new evidence and practically would present a new case, and as further, with such light as we now have, the right to damages seems at least doubtful, we deem it sufficient if the rights of the plaintiff, if any, in that regard, are reserved. The question is raised pointedly by Article I, Section 14, of the Constitution of 1879. That provides that "private property shall not be taken or damaged for public use without just compensation having first been made."
>
> The plaintiff seems to argue that this section entitles it to preliminary compensation for any considerable pecuniary detriment that the city can inflict by the establishment of the new road, however lawfully it may act. Courts and judges have differed widely in their interpretation of this class of provisions in statutes of different sorts; but we should suppose, until otherwise instructed by the Supreme Court of the State, that the damage referred to in this section of the State Constitution in the main would be damage resulting from conduct that, like taking, would be tortious unless in proceedings under eminent domain or some law authorizing it on condition that damages be paid.
>
> As to crossing the plaintiff's tracks we are inclined to agree with the District Court that the plaintiff's franchise must be understood to be subject to this incident and that a taking by eminent domain was not necessary. (Market Street Railway *vs.* Central Railway, 51 Cal. 583. Consolidated Traction Company *vs.* South Orange & Maplewood Traction Co., 56 N. J. Eq. 569, 574, *et seq.* 3 Dillon, Municipal Corporations, fifth edition, Section 1241, p. 1983.) If we are wrong and if the crossings or the manner of operating the parallel tracks should give or has given rise to any claim, the decree will be without prejudice to such claim. We assume in accordance with the company's evidence and argument that the damage may be considerable and we think it just to leave open whatever can be left open, but at present we cannot say that the loss is or will be of such a character that it must be paid for, and we are satisfied that it is not such as to call for equitable relief.

The arguments presented in the briefs submitted by the company and the city in this case were noted in the ELECTRIC RAILWAY JOURNAL of April 12, page 750.

# Illinois Public Utilities Wake Up

## Go to the Public in Bold Publicity Program—Invite the Spotlight—Big Capital Investments Planned

The public utilities of Illinois—traction, electric, gas, water and telephone companies—are to place their "after-war" case directly in the hands of their customers to whom they are responsible and let the public be the judge and jury.

Adopting as their slogan "There can be no prosperity in Illinois unless the public utilities are prosperous," the utilities have issued an invitation to the public to "put the spotlight on us." Their composite "case" is to be made known through the Illinois Committee on Public Utility Information, whose organization has just been announced. This committee, with offices in the Bedford Building, 203 South Dearborn Street, Chicago, is to operate "under the auspices of the Illinois Electric Railway Association, Illinois Gas Association, Illinois State Electric Association, and other public service organizations, and in the interest of their customers, investors and employees."

### ASK ONLY JUST TREATMENT

With the budgets of Illinois public utility companies, from Cairo to the Wisconsin border, calling for $70,000,000 of after-war rehabilitation work and extensions this year—a program which will do much to relieve business hesitation—the utilities will be unable to go ahead unless their credit, which means ability to obtain the necessary funds, is unimpaired. Their expenditures this year, alone, would mean the spending of $60,000,000 in excess of the $10,000,000 which the State plans to spend in its great good roads project. And in the five-year period of road making, during which the State will spend $50,000,000, the public utilities' plans call for the expenditure of $450,000,000, or nearly eight times as much. They are asking only for "sane scientific, non-political and just treatment," such as will enable them to perform the services imposed by their intimate relationship with the every-day life of every man, woman and child in the State and the communities in which they operate.

The purpose of the committee, is outlined in a public statement in part as follows:

> The committee proposes to do now for the public utilities what the railroads failed to do until they were almost strangled, namely, to put before the people of Illinois, by every possible means, the economic facts of the public utility industry, as an industry. This takes in the small town light plant as well as the big city electric company or electric railway system; "independent" and "farmer" telephone companies, as well as the Bell interests.
>
> ### EVERY CITIZEN IS INTERESTED
>
> Every person who uses a telephone, rides on a street car or cooks or reads with gas or electricity is entitled to know the facts concerning these companies.
>
> Without efficient utilities, cities and towns cannot prosper, and utilities cannot be efficient without prosperity. They must pay their bills like people. Labor is vitally concerned, probably more than any other element, because it knows that the high wage scales necessitated during the war by high living costs cannot be maintained unless the utilities are given just treatment.
>
> The public utility companies have been seriously affected by the war. With tremendous wage increases necessitated by the high cost of living, which shows but little, if any, abatement, and prices of materials up not less than 100 per cent and in some instances three times that, they have not had consideration commensurate with their dues.
>
> Upon their ability to earn a just wage depends their ability to spend money for wages, for improvement of service and for new building, the result of which means improvement of the community in which they operate. It is to the interest of every citizen that the public utility companies, upon which he depends so much, shall be fairly treated and that their facilities shall be developed to the utmost. It is only through this that he can obtain the service which should be his.
>
> ### WANT PUBLIC TO KNOW FACTS
>
> Affecting the credit of the light, heat, railway, power or telephone companies in any city or town immediately means inferior service. It cannot be otherwise. The company cannot furnish something it has not the money to buy for the customer. No reasonable man will contend that capital is not entitled to a fair wage, as well as labor, or that the investments which go to build up and make a community should not

be as well protected as the home a man and his wife have bought with their savings.

The situation is not a pleasant one, but is one which must be met squarely in a calm, scientific, non-political and just way, without prejudice or demagogery.

If the utilities are not to be strangled, the best preventive is public knowledge of the economic facts which go to make the tremendous factor they are in the State's industrial and economic life. Unless they prosper, there will be no prosperity in Illinois. Just treatment is essential to the maintenance of good service and to the protection of investors. The undermining of the credit of the utilities cannot fail to have far-reaching effects upon general credit and business prosperity, for their credit cannot be placed in jeopardy and the effect localized or even restricted to these companies.

The utilities believe open and above-board exploitation of the economic facts of the industry is sound policy for now and the future. They are content to submit their case to their customers, believing that to be the road to just treatment and freedom from unwarranted burdens that would prevent adequate service and forestall the great development program which must be carried out to meet the State's needs.

## Public Ownership Dead

### Thirteen Electric Railway Bills Reported Adversely to Massachusetts House by Legislative Committee

Adverse reports on thirteen electric railway bills have been made in the Massachusetts House by the legislative committee on street railways, the most important bills being those relating to public ownership.

The bill providing for public control of all electric railways except the Boston Elevated Railway and the Bay State Street Railway having $300,000 capital or more which was the subject of long and continued hearings before the committee was referred to the next General Court. Leave to withdraw was reported on the petition that cities and towns may acquire and operate electric railways.

Reference to the next Legislature was reported on the bill providing state ownership of electric railways, and leave to withdraw was given on the petition for a referendum on the same question. The committee still has the bill relieving companies of paying taxes before it, as well as the so-called "50-50" bill providing for municipal aid for electric railways, to be extended through a tax levy.

Leave to withdraw was also reported on the following bills: To provide a 5-cent fare within a 5-mile radius of the State House; to discontinue the public operation of the Boston Elevated Railway; to authorize the Bay State Street Railway to acquire the rights of the Boston Elevated Railway in East Boston and the East Boston tunnel; to prohibit companies from carrying more passengers than can be seated; to take dividends on common stock of the Boston Elevated Railway as a basis for fares; to provide a single electric railway fare within the city limits of Boston; to provide further legislation in regard to the transportation of school children in Metropolitan Boston.

The bills for improved transportation in the Metropolitan district and for the incorporation of the Boston Rapid Transit Company have also been referred to the next Legislature.

## Detroit Conference May 9

### Mayor, Street Railway Commission and Railway Representatives Asked to Discuss Railway's Future

The Common Council of Detroit, Mich., will invite Mayor Couzens, the members of the Street Railway Commission and representatives of the Detroit United Railway to a conference on May 9 to consider the local electric railway situation, which has again become an issue as the result of the defeat of the municipal ownership proposal at the recent election.

Subsequent to this conference it is purposed by the Council to hold a public hearing on the matter of electric railway transportation at which citizens will be invited to suggest ways and means to get adequate service for Detroit.

The Street Railway Commission has recently received replies from Henry Ford, Detroit, and Fielder Sanders, Street Railway Commissioner of Cleveland, both of whom had been asked for information on transportation affairs. Mr. Sanders says he will visit Detroit prepared to explain the Cleveland service-at-cost plan. Henry Ford, however, in his letter expressed his hesitancy at co-operating with the Street Railway Commission until he shall be sure that it "can claim to represent Detroit." Mr. Ford's letter read in part as follows:

> It is my belief that the commission has taken upon itself a great responsibility in assuming that the recently submitted purchase plan was defeated because of statements made by Charles E. Sorenson, which would indicate that the people of Detroit are not capable of deciding matters of such importance for themselves.
>
> Repudiation by the voters of the railway plans as submitted makes it seem questionable in my mind whether or not you can claim to represent the people of the city of Detroit.
>
> When you are able to furnish me with reasonable assurance of this fact, I will be glad to co-operate with you in working out the development of a new type of gas or electric car for street railway purposes.
>
> However, the question of whether or not we will co-operate with you or any other accredited representative of the city of Detroit will not deter us in any way from carrying out what we have already undertaken in such development, and when we are ready to demonstrate the merits of the new type of car it will be left for the judgment of the citizens of Detroit.

In connection with Mr. Ford's letter there is need for relating a little local Detroit history in order that events may be set in the proper perspective. The announcement about the new Ford street car was made almost on the eve of the municipal ownership election. There are some that professed to see in this a move by Mr. Ford against his old associate, Mayor Couzens. No one will probably ever know what the effect was of the agitation about the car on the election result, but there is no room left for guessing about the rebuke to the commission contained in Mr. Ford's letter to that body. On the other hand it would seem that the commission has rendered it imperative for Mr. Ford to make plain just what an anxious world may expect from the new Ford car. So far there has been little more tangible about the car than words.

## News Notes

**Receivers Refuse Wage Request.**—The receivers of the Pittsburgh (Pa.) Railways have refused the request of motormen and conductors for an advance of 12 cents an hour in wages. They assert the financial condition of the company will not permit the increase in wages. Concessions were made in improving working conditions and other regulations that would not involve wage costs. All employees of the company are to be transported free on its own lines.

**Paying Back Wages in Buffalo.**—The first payment of $50,000 of the $225,000 due the employees of the International Railway, Buffalo, N. Y., as back wages as the result of the award of the War Labor Board was made on April 28. In addition to the union platform employees, officials of the company and other employees in the offices are represented in the payments of the back wages. The second installment of $50,000 will be paid on Nov. 14, 1919; the third installment of $25,000 on Dec. 21, 1919, and the last installment of $100,000 on Jan. 28, 1920.

**A Union Plea for Leniency.**—Efforts by representatives of the local railway union to obtain mitigation of the punishment imposed upon employees of the Seattle (Wash.) Municipal Railway who joined in the recent general strike, has brought a promise from Mayor Ole Hanson that he will take the matter up at an early date and give the men an opportunity to be heard before a conference of heads of various city departments. Employees in the railway department who quit their jobs during the strike were penalized, by losing their annual two weeks' vacation and being suspended for fifteen days. The union is seeking to substitute the two weeks' vacation for the fifteen day layoff.

**Strike in McAlester Settled.**—Settlement of labor troubles, which threatened to cut off light, power and transportation from the people of McAlester, Okla., and neighboring towns, is reported in a telegram to the Labor Department by Commissioner Robert McWade of the Adjustment and Conciliation Service. The trouble arose over discharge of certain skilled workers. A section of the local union of railway men on the Pittsburg County Railway took up their cause and formed a new organization, later going on strike. The trouble was spreading to workers in other fields when it was agreed to submit all differences to a board of arbitration. In its decision the board supported the Amalgamated Association of Street & Electric Railway Employees of America.

# Financial and Corporate

## Receivership Is Limited

### Temporary Appointments at Chattanooga Cover Only Railway Lines—Further Argument May 17

John S. Graham, Philadelphia, Pa., and Percy Warner, Nashville, Tenn., as noted very briefly in the ELECTRIC RAILWAY JOURNAL for April 19, page 800, have been appointed by Judge E. T. Sanford as temporary receivers of the Chattanooga Railway & Light Company, Chattanooga, Tenn. A decree entered at Knoxville limits their scope as such pending a hearing before Judge Sanford on May 17.

### DECREE A COMPROMISE

For the time being the receivership extends only to the railway system, properties connected with the light department being expressly excepted pending litigation on that phase of the original petition. The preliminary decree is the result of a compromise agreement which makes the matter of including the light department of the company as subject to mortgages covering the railway properties dependent upon a decision after that question has been fully argued and testimony heard on that point.

The original application of the Commercial Trust Company, Philadelphia, Pa., the petitioner, sought to have all resources of the Chattanooga Railway & Light Company included in the receivership. The light department is closely allied with the Tennessee Power Company, which even in normal times furnished power to the railway.

The Chattanooga Railway & Light Company was in its inception a consolidation of the railway system and the light system and on that account the holders of the mortgages, now sought to be foreclosed, are seeking to have the light and power equipment included in the receivership. Resistance to that feature of the original petition has been most determined and in the hearing to come it will probably be the chief question for argument.

### CONSOLIDATION IN 1909

The Chattanooga Railways, which was the successor of the Chattanooga Electric Railway, was owned by the Grahams of Philadelphia. The Chattanooga Electric Company was a separate corporation and under an entirely different ownership. When the E. W. Clark interests went to Chattanooga in 1909 they made their investments on the theory that the two should be consolidated, and that was effected before the new corporation was organized. The name of the new organization thus became the Chattanooga Railway & Light Company.

As a part of the compromise under which the temporary receivers are named and their scope limited to the railway system, Judge Sanford protects them by issuing an injunction requiring the Chattanooga Railway & Light Company to continue to provide the power for operation of the cars.

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## Change in Control in Iowa

### Minority Interests in Iowa Southern Utilities Company Take Over Control

David G. Fisher & Company, Davenport, Ia., public utility engineers and holders of a minority interest in the Iowa Southern Utilities Company, which furnishes electric power to thirty Iowa towns, operates 33 miles of interurban railway and runs the Centerville railway, gas, heating and electric light plants, have purchased the holdings of Frank S. Payne and D. C. Bradley in the company. Mr. Payne, who has been general manager, will remain with the company as director and general counsel. It is understood that the transaction involved in the neighborhood of $450,000.

The formal transfer of control will be made on May 15. J. C. Johnson, now secretary and treasurer of the Fisher Company, will be the new general manager of the properties. Before becoming affiliated with the Fisher Company he was superintendent of the Fiske Street station in Chicago. Ernst Jacobsen, vice-president of the Fisher Company, will have a prominent part in the active administration of the company.

The Fisher Company was organized in Davenport in 1909 and soon began to purchase and operate public utility plants. Most of the company's holdings are located in Iowa. The Interurban lines, from Centerville to Albia and Mystic, are important coal carriers, delivering the output of thirty mines to the Burlington, the Rock Island and Minneapolis & St. Louis Railroads.

The Iowa Southern Utilities Company was formed by a consolidation of Payne, Bradley and Fisher interests in the fall of 1916. The companies which it controls include the Centerville Light & Traction Company, Centerville Electric Company, Centerville Gas Company, Leon Electric Company, Mount Ayr Light & Power Company, Lennox Electric Company, Clearfield Electric Company and the Blockton Light & Power Company.

The interurban line from Centerville to Mystic was built in 1909. The interurban from Centerville to Albia, the successor of the old Albia & Centerville Railway, was opened for operation in the year 1914.

## Deficit in New Jersey

### Public Service Railway Went Behind $302,115 in March Over Same Month a Year Ago

The net income of the Public Service Railway, Newark, N. J., for March showed a deficit of $302,115, as set forth in a statement filed by the company on April 17 with the Board of Public Utility Commissioners. The net income for March, 1918, was $73,325, so that the variation between the two months amounts to $375,440 in income account.

Revenues from transportation during March amounted to $1,600,734, as compared with $1,523,796 in March, 1918. The passenger revenue increased from $1,519,792 in March, 1918, to $1,596,965 last month. The total operating revenue, as between the two months, increased from $1,561,198 to $1,641,076. Railway operating revenue deductions increased from $1,060,736 to $1,511,335, so that railway operating income was reduced from $500,461 to $129,741, and total operating income from $501,129 to $129,860.

Gross income was reduced from $506,005 to $135,123, and income deductions increased from $432,679 to $437,239. Income deductions in detail for last month were as follows: Leased roads, $237,022; miscellaneous rents, $8,960; interest on funded debt, $179,005; interest on unfunded debt, $7,333; amortization of discount on funded debt, $1,342, and miscellaneous debits against income, $3,596.

### SURPLUS DECREASED $302,115

In March, 1918, the surplus of the company showed a net increase of $74,128, while last month it showed a net decrease of $302,115. The percentage of operating expenses to operating revenues, which was 59.5 for March, 1918, was increased to 83.1 last month, and the percentage of operating expenses (including taxes) to operating revenues, increased from 67.9 to 92.1.

A comparative statement of operating revenue deductions for March, 1918, and last month shows the following increases: Ways and structures, from $114,961 to $154,271; equipment, from $91,969 to $221,412; power, from $183,478 to $224,140; conducting transportation, from $409,137 to $601,640.

Total operating expenses increased from $929,303 to $1,362,954, and total operating revenue deductions from $1,060,736 to $1,511,335.

The company carried a total of 27,388,360 passengers last month, of whom 22,283,107 were revenue passengers and 5,105,253 transfer passengers. The passenger revenue amounted to $1,547,832 from cash fares and $49,133 from revenue transfers.

Passenger traffic figures for March, 1918, were not given in the company's March report for the reason that in March of this year a six-day strike disrupted the service and figures as to traffic for that month would be in no way comparable to figures covering traffic in March, 1918.

## Net Income Almost Doubled

### Chicago-North Shore Line Enjoys Sixty-five Per Cent Gain in Revenues, Partly Due to War Traffic

During the year ended Dec. 31, 1918, as compared to the one preceding, the Chicago, North Shore & Milwaukee Railroad, Chicago, Ill., gained $255,619 or 91.5 per cent in net income. This unusual showing was brought about largely by the fact that the percentage advance in operating revenues kept practically on even terms with that in operating expenses.

INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD FOR CALENDAR YEARS 1917 AND 1918

| | 1918 | | 1917 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Operating revenues: | | | | |
| Passengers and special car | $2,678,693 | 92.4 | $1,629,306 | 93.0 |
| Freight and express | 151,729 | 5.2 | 105,801 | 6.0 |
| Miscellaneous | 69,553 | 2.4 | 16,266 | 1.0 |
| Total | $2,899,975 | 100.0 | $1,751,373 | 100.0 |
| Operating expenses: | | | | |
| Way and structures | $302,525 | 10.5 | $161,994 | 9.2 |
| Equipment | 172,183 | 5.9 | 81,999 | 4.7 |
| Conducting transportation | 650,042 | 22.4 | 395,455 | 22.6 |
| Power | 354,173 | 12.2 | 250,549 | 14.3 |
| Traffic | 35,100 | 1.2 | 27,657 | 1.6 |
| General and miscellaneous | 342,015 | 11.8 | 196,858 | 11.2 |
| Total | $1,856,038 | 64.0 | $1,114,512 | 63.6 |
| Net operating revenue | $1,043,937 | 36.0 | $636,861 | 36.4 |
| Taxes assignable to operations | 185,821 | 6.4 | 95,680 | 5.5 |
| Operating income | $858,115 | 29.6 | $541,181 | 30.9 |
| Non-operating income | 9,469 | 0.3 | 4,858 | 0.2 |
| Gross income | $867,584 | 29.9 | $546,039 | 31.1 |
| Deductions from income | 332,506 | 11.4 | 266,580 | 15.2 |
| Net income | $535,078 | 18.5 | $279,459 | 15.9 |

In 1918 the total operating revenues showed a gain of $1,148,602 or 65.6 per cent, the largest amount coming from passenger and special car revenues, which rose $1,049,387 or 64.4 per cent. The freight and express revenues also displayed the very substantial gain of $45,928 or 43.4 per cent, while the miscellaneous revenues advanced $53,287 or 327.6 per cent.

The jump in operating expenses amounted to $741,526 or 66.5 per cent. All the items in the operating-expense group shared in the rise, the respective amounts and percentages being as follows: Maintenance of way and structures, $140,531 or 86.7 per cent; maintenance of equipment, $90,184 or 109.9 per cent; conducting transportation, $254,587 or 64.6 per cent; power, $103,624 or 41.3 per cent; traffic, $7,443 or 26.9 per cent, and general and miscellaneous, $145,157 or 73.7 per cent.

The effect of the nearly equal percentage increase in operating revenues and expenses was a gain in net operating revenue of $407,076 or 63.9 per cent. Taxes increased at a greater rate, by $90,141 or 94.2 per cent, but income deductions at a less rate, by $65,926 or 24.7 per cent. The net income for the year, therefore, rose $255,619 or 91.5 per cent. The surplus balance on Dec. 31, 1918, was $855,811 as compared to $320,732 the year before.

The heavy increase in gross operating revenues was partially due to the large amount of traffic produced by the war activities in the various cities and also at the government posts served by the company. The operating expenses rose because of the large increases in wages and materials. The advance would have been accentuated if the increased price of coal had been figured in the cost of power consumed, but fortunately the major portion of the power, which was purchased under contract with the Public Service Company, was not advanced in price. On the Wisconsin end of the road the power was furnished by the Milwaukee Electric Railway & Light Company, which owing to the increased cost of labor and coal made a substantial advance in accordance with the order of the Wisconsin Railroad Commission.

During 1918 the Chicago, North Shore & Milwaukee Railroad expended for additions and betterments and for reconstruction the sum of $511,639. The balance sheet total for cost of road equipment and property was $13,902,262 at the end of 1918.

In spite of the big increase in traffic, the 1918 accident record showed marked improvement. Employee accidents in 1918 decreased 17.4 per cent as compared with those of 1917; employees' disability accidents decreased 38.3 per cent; lost time on account of employee accidents decreased 34.3 per cent; public accidents decreased 45.4 per cent, and property damage (public) decreased 44.8 per cent. The total accidents fell off 34.1 per cent.

## Lease Abrogation Hearing on May 14

Presiding Justice Tanner in the Superior Court has designated May 14 as the date for a hearing on the petition of Edwards & Angell, counsel for the Union Street Railroad, the Pawtucket Street Railway, the Rhode Island Suburban Railway and the United Traction & Electric Company, asking the court to declare the leases of their properties to the Rhode Island Company to have expired on April 21 because of default in payment of rentals due. The total rentals and payments now due and payable to the petitioning lessor companies under the terms of the leases are said to amount to $331,925.

The prayer of the petition is for a decree of the court declaring the leases expired on April 21 by the default of the Rhode Island Company; that the lessor petitioners be declared entitled to possession of all premises and properties involved in the terms of the leases and that the receivers be directed forthwith to make payment in full of all sums named as due the lessor petitioners; that the receivers be directed forthwith to pay in full all sums due under the war revenue act of 1918 and all taxes to the proper persons. The court is also asked to direct the receivers to pay the petitioners for the use of their railway property until it is turned over into the possession of the lessors.

## Pittsburgh Results Improve

In its issue of May 1 the *Wall Street Journal* reviewed briefly the operations of the Philadelphia Company, Pittsburgh, which includes the Pittsburgh Railways among its subsidiaries. That paper said:

> Earnings of Pittsburgh Railways are not included in current statements. The traction company is still in the hands of receivers. The Philadelphia Company operates several traction lines, aside from the last mentioned company, and earnings of these companies show a substantial increase over 1918. The Pittsburgh Railways is charging a 7-cent fare on all its lines, an advance of 2 cents over the 5-cent rate in effect a year ago. It is believed that the company will shortly be able to work out of its difficulties, due to the increase in fares. Bondholders who contended that the Philadelphia Company was liable for interest on underlying bonds of the railway company in receivership, received a setback recently when the court ruled that no liability attached to the parent company.

## Providence Company Doing Better

The deficit of the Rhode Island Company, Providence, R. I., for January, February and March was $263,055, a decrease of $4,535 from the deficit for the corresponding period in 1918. Figures filed at the office of the Pubilc Utilities Commission indicate that the deficit for the month of March was $91,463, the total operating revenue for the month being $552,029, as compared with $507,727 for February. The statement filed by the company notes a further decrease in car service, 148,290 fewer car-miles being run than in March, 1918. The net operating income showed a decrease of $6952 and the total net income a decrease to the extent of $6,453.

Chairman Bliss of the Public Utilities Commission explained that the company's statement indicated that the increase in fares permitted had reduced what would otherwise have been an appreciable increase in the company's deficit and if it were not for the increased operating expenses due primarily to the advance in wages of employees, the company would be operating at a profit.

## Indianapolis Operating Net Drops Nearly 20 Per Cent

The gross earnings and operating expenses of the Indianapolis Traction & Terminal Company, lessee of the Indianapolis Street Railway, for the years 1918 and 1917, and the changes for this period, were as follows:

| | 1918 | 1917 | Change |
|---|---|---|---|
| Gross earnings... | $3,573,499 | $3,654,633 | —$81,134 |
| Operating expenses...... | 2,417,407 | 2,212,012 | +205,394 |
| Net earnings from operation...... | $1,156,092 | $1,442,620 | —$286,528 |

The decrease of 2.2 per cent in earnings and the increase of 9.3 per cent in operating expenses shown in the foregoing figures were the result of war prices and the inability of the company to secure an increase in its rate of fare until October, 1918. The combined effect was a loss of 19.9 per cent in net earnings from operation for 1918 as compared to 1917.

The statement of maintenance of way and structures and of maintenance of equipment is given below:

| | 1918 | 1917 | Change |
|---|---|---|---|
| Maintenance of way and structures... | $298,434 | $377,384 | —$78,950 |
| Maintenance of equipment.... | 329,144 | 233,889 | +95,255 |
| Total maintenance....... | $627,579 | $611,273 | +$16,305 |

Thus, while there was a decrease of 20.9 per cent in expenditures for maintenance of way and structures in 1918 as compared with 1917, there was an increase of 40.7 per cent in expenditures for maintenance of equipment, owing in a large measure to the increased cost of labor and material. The total expenditures for maintenance in 1918 exceeded the expenditures in 1917 by 2.67 per cent. The decrease in expenditures on account of maintenance of way and structures was due, to some extent, to the scarcity of labor and the difficulty in securing the needed materials.

## New York Subway Deficits Grow

Figures compiled by the Public Service Commission for the First District of New York show that the total deficit of the Brooklyn Rapid Transit Company under the dual contracts providing for rapid transit to March 1 last was $2,729,147 and that the city's deficit was $9,255,934. These deficits have been growing since the contracts were made on Aug. 4, 1913, and in the case of the city the deficit cannot be reduced until that of the company is entirely wiped out. In both instances the deficits are cumulative.

A comparative statement of the figures for February of 1919 and 1918 discloses that the total reductions for rents, taxes, depreciations, etc., for 1919 were $1,155,000, and for 1918 they were $960,000; the total revenues for the same month in 1919 amounted to $1,154,000 and in 1918 to the sum of $968,000.

It is pointed out that the city's interest due on the subway fund for February, 1919, was $211,000 and in 1918 it was $117,000. The total deficit for February, 1919, in revenues necessary to take care of all the charges was $390,000, and in 1918 it was $248,304. In February, 1919, the revenues increased over the same month the year before $186,000.

The poor results are attributed directly to the additional costs due to the war.

## Another Rhode Island Reorganization Step

The Rhode Island Legislature in its closing hours passed the bill chartering the United Electric Railways. When the bill came up for consideration in the House of Representatives, the Democratic minority opposed the passage of the measure, characterizing it as loosely drawn. The Republicans, however, voted down the opposition and the bill was sent to the Senate. In the latter body it was held as a weapon to secure concessions of a political character from the House, but was finally passed without opposition.

The bill makes possible a reorganization of the Rhode Island Company by the establishment of one company owning all its properties in place of the present leasing arrangement.

When the reorganization plans have matured sufficiently to warrant the surrender of the charter, the incorporators, the Governor, Commissioner of Banking and Tax Commissioner will turn the charter over to the reconstituted company.

## Success of Enactment

The residents and cottagers of Ocean City, N. J., are greatly pleased with the signing by Governor Edge of a bill that gives relief to the town in the way of railway service during the coming summer. In consequence the line of the Ocean City Electric Railroad will again be put into operation.

The new law authorizes municipalities of the fourth class in case of the abandonment or refusal of a railway to operate, to present a petition to the Court of Chancery for the appointment of a trustee to run the lines upon the terms and conditions that may be imposed by the chancery court. Such cities have a right to advance a sufficient amount of money for the operation, the municipality to be repaid the money advanced, together with taxes.

The person appointed to act as trustee is to furnish a bond for the faithful performance of his duties and to render an account of all money received and expended by him.

Some time ago the committee representing the Ocean City Electric Railroad notified the city that it was unable to meet operating expenses and offered to sell the road for $84,000. Mayor Champion was unable to raise the necessary amount among the residents of the town and the bill in the Legislature was the result. The terms of operation will be made known soon by Mayor Champion.

## Preparing for Inland Empire Foreclosure Sale

The Hill interests, controlling the Great Northern, Northern Pacific and other railway systems, may buy the Spokane & Inland Empire Railway at the receiver's sale some time in June or early in July.

This is the possibility advanced by George H. Taylor, vice-president of the investment house of E. H. Rollins & Sons, Chicago, representing bondholders of the Inland system. Mr. Taylor and H. D. Whitehouse, the firm's engineer, arrived in Spokane recently to inspect the Spokane & Inland Empire property. The former is a member of the bondholders' protective committee, which holds $3,300,000 of the company's bonds. He is reported to have said:

> The Hill interests will possibly buy the property at the auction. They have $12,000,000 invested in it, and own 55 per cent of the stock, I believe. The sum of $6,697,556 is due the Great Northern and its subsidiary company, the Northwestern Investment Company. I have not heard that they have sent any men here to investigate, but in view of these facts, it is possible that they will be the purchasers.

Mr. Taylor declared that the bondholders would not attempt to operate the system.

# Financial News Notes

**Jackson Wants Local Ownership and Control.**—Business men and prominent citizens of Jackson, Miss., are reported to be organizing for the purpose of submitting a bid for the property of the Jackson Light & Traction Company, which went into the hands of receivers recently.

**Wants to Abandon Interurban.**—The Union Savings Bank & Trust Company, as trustee for the note issue of the Cincinnati & Columbus Traction Company, Cincinnati, Ohio, on April 17 filed an application with the Ohio Public Utilities Commission for authority permanently to abandon and dismantle the company's entire interurban line from Cincinnati to Hillsboro, 54 miles.

**Change in Name by Maine Company.**—On April 1, the name of the Rockland, Thomaston & Camden Street Railway was changed to Knox County Electric Company. All directors and officers of the corporation remain the same, the name only undergoing change. The affairs of the company will be managed and carried along as previously, but under the new name.

**Successor Company at Selma.**—A certificate of incorporation of the Selma (Ala.) Electric Company has been filed by Charlotte L. Waters, Gertrude E. Abbott, D. L. Gerould, and Hugh Mallory, with D. L. Gerould, of Warren, Pa., named as president. Hugh Mallory is named as secretary-treasurer and general manager. It is understood that the new company is formed as the successor to the Selma Traction Company, the property of which will be sold at auction in May.

**Dividend on Common Stock Passed.**—The directors of the Twin City Rapid Transit Company, Minneapolis, Minn., have decided to pay no dividends on the common stock of the company for the first quarter of 1919, according to announcement by Horace Lowry, president of the company. Net income for the month of March, 1919, shows a decrease of 49.17 per cent as compared with March, 1917. For the three months of 1919, the decrease is 58.12 per cent as compared with the 1917 period.

**Hearing on Funding Issue.**—Testimony was taken by the Board of Public Utility Commissioners on April 29 on the application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for authority to issue $40,000 of bonds for the purpose of funding the cost of the Trenton Junction extension of its line. The application was taken into conference and a decision will be announced later. The company is now building a shorter line to Trenton Junction and will continue the road through the village. At the present time the line runs to the outskirts of the town.

**Holding Company Not Responsible.**—Judge Charles P. Orr in the United States District Court at Pittsburgh, Pa., on April 10 dismissed the suit brought to hold the Philadelphia Company responsible for the interest due upon bonds of the United Traction Company, a subsidiary of the Pittsburgh Railways, which is in the hands of receivers. The plaintiff wished the court to make the bonds an obligation of the Philadelphia Company, which controls the Pittsburgh Railways and is in turn controlled by the United Railways Investment Company.

**Estimating Municipal Line's Requirements.**—Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has filed an estimate with the City Council of cost of operating the Seattle Municipal Railway during the month of May. He places the sum at $362,645. The total is approximately $60,000 more than the April estimate, the difference including an increase in the transportation department, due, it is claimed, to the operation of more cars, and expense of making improvements in the property. According to Mr. Murphine's report, the increase in car-hours compared to April, 1918, will be about 1000 a day. This will increase the wage cost approximately $1,000 a day.

**Abandonment Authorized.**—The Public Service Commission for the Second District of New York on April 17 granted the petition of the Yonkers Railroad for permission to abandon that portion of its lines within the village of Hastings. The appeal made by the railroad for the abandonment of the Hastings line was contained in the petition filed by the company some time ago in which the railroad sought to abandon portions of several of the Yonkers lines. On April 14 counsel for the railroad filed a request with the commission to withdraw its petition, but only as regards the Yonkers lines and excepting the Warburton Avenue line, north of the Yonkers city line. Corporation Counsel Walsh of Yonkers filed a formal consent to the discontinuance of these abandonment proceedings.

**Consolidation of Receivership Suits Opposed.**—Attorneys Ephraim Caplan and Randolph Laughlin, representing petitioners in two of the receivership suits against the United Railways, St. Louis, Mo., are opposing the attempt of litigants against the company to consolidate the four actions pending for the appointment of a permanent receiver. They contend the appointment of a receiver in one of the petitions carries with it a receivership in all the cases pending. Rolla Wells recently was appointed temporary receiver in the suit of Samuel W. Adler, a bondholder. Attorneys for the United Railways joined in the request for the appointment of a receiver in that suit. They resist the naming of a receiver in the other suits, however. In opposing the motion for a blanket receivership Attorney Priest for the company declared the suits pending against the railway company are diverse in nature, and have for their object widely different purposes.

**Commission Approves Abandonment.**—The California Railroad Commission has granted the request of the Pacific Electric Railway for authority to abandon service and remove tracks and overhead on its Brockton Avenue line in Riverside, but the abandonment is limited to that part of the line southerly of Jurupa Avenue. General use of privately-owned autos is held by the railway people to have caused a marked falling off in the patronage of the line. Investigation by the commission's examiner showed that in the territory north of Jurupa Avenue served by the Brockton line, 42 per cent of the homes possessed autos. In the homes without autos there are 178 adults and ninety-three school children. In the homes with autos there are 167 adults and fifty-five school children. For the reason that 271 patrons of the line would be seriously inconvenienced by the cutting out of service in this section, the commission denies the company's application so far as it concerns this district, but without prejudice to a future application provided future patronage, coupled with economical operation by the railway company through the use of one-man cars, shows the need for reopening the case.

# Electric Railway Monthly Earnings

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| BATON ROUGE (LA.) ELECTRIC COMPANY | | | | | |
| 1m., Feb., '19 | $28,440 | *$17,129 | $11,311 | $3,949 | $7,362 |
| 1m., Feb., '18 | 19,847 | *10,644 | 9,203 | 3,717 | 5,486 |
| 12m., Feb., '19 | 286,145 | *159,179 | 126,966 | 46,952 | 80,014 |
| 12m., Feb., '18 | 234,074 | *122,512 | 111,562 | 43,071 | 68,491 |
| CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S. | | | | | |
| 1m., Feb., '19 | $42,963 | *$33,900 | $9,063 | $6,667 | $2,396 |
| 1m., Feb., '18 | 36,294 | *28,999 | 7,295 | 6,534 | 761 |
| 12m., Feb., '19 | 530,436 | *401,011 | 129,425 | 78,832 | 50,593 |
| 12m., Feb., '18 | 471,213 | *317,849 | 153,364 | 78,618 | 74,746 |
| COLUMBUS (GA.) ELECTRIC COMPANY | | | | | |
| 1m., Feb., '19 | $86,676 | *$47,975 | $38,701 | $34,842 | $3,859 |
| 1m., Feb., '18 | 96,461 | *38,811 | 57,650 | 32,255 | 25,395 |
| 12m., Feb., '19 | 1,184,435 | *593,879 | 590,556 | 402,823 | 187,733 |
| 12m., Feb., '18 | 1,130,911 | *436,953 | 693,958 | 366,316 | 327,642 |
| EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX. | | | | | |
| 1m., Feb., '19 | $103,194 | *$63,412 | $39,781 | $13,973 | ‡$25,932 |
| 1m., Feb., '18 | 80,408 | *44,520 | 35,888 | 12,851 | ‡26,183 |
| 12m., Feb., '19 | 1,181,044 | *701,205 | 479,839 | 165,833 | ‡315,781 |
| 12m., Feb., '18 | 950,583 | *529,923 | 420,660 | 143,591 | ‡303,137 |
| EL PASO (TEX.) ELECTRIC COMPANY | | | | | |
| 1m., Feb., '19 | $120,067 | *$85,741 | 34,326 | $6,879 | $27,447 |
| 1m., Feb., '18 | 103,875 | *66,475 | 37,400 | 6,513 | 30,887 |
| 12m., Feb., '19 | 1,287,428 | *905,222 | 382,206 | 81,949 | 300,257 |
| 12m., Feb., '18 | 1,274,162 | *813,815 | 460,347 | 69,477 | 390,870 |
| GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX. | | | | | |
| 1m., Feb., '19 | $222,153 | *$179,790 | $42,363 | $40,431 | $1,932 |
| 1m., Feb., '18 | 181,822 | *125,615 | 56,207 | 38,977 | 17,230 |
| 12m., Feb., '19 | 2,779,968 | *1,953,031 | 826,937 | 475,332 | 351,605 |
| 12m., Feb., '18 | 2,152,766 | *1,425,212 | 727,554 | 455,470 | 272,084 |
| HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH. | | | | | |
| 1m., Feb., '19 | $25,504 | *$17,142 | $8,362 | $4,999 | $3,373 |
| 1m., Feb., '18 | 26,644 | *19,126 | 7,518 | 5,075 | 2,443 |
| 12m., Feb., '19 | 313,958 | *212,082 | 101,876 | 60,151 | 41,725 |
| 12m., Feb., '18 | 345,198 | *219,814 | 125,384 | 61,042 | 64,342 |
| JACKSONVILLE (FLA.) TRACTION COMPANY | | | | | |
| 1m., Feb., '19 | $78,365 | *$69,658 | $8,707 | $18,014 | †$9,307 |
| 1m., Feb., '18 | 66,003 | *47,244 | 18,759 | 170,030 | 1,729 |
| 12m., Feb., '19 | 978,241 | *763,004 | 215,237 | 201,261 | 13,976 |
| 12m., Feb., '18 | 716,590 | *488,380 | 228,210 | 190,752 | 37,458 |
| PHILADELPHIA (PA.) RAPID TRANSIT COMPANY | | | | | |
| 3m., Mar., '19 | $8,217,080 | *$5,882,376 | $2,334,704 | $2,418,064 | ‡$58,763 |
| 3m., Mar., '18 | 7,225,940 | *4,723,570 | 2,502,370 | 2,401,517 | ‡262,913 |
| PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE. | | | | | |
| 1m., Feb., '19 | $686,911 | *§$398,649 | $288,262 | $184,189 | $104,073 |
| 1m., Feb., '18 | 577,581 | *§327,385 | 250,196 | 177,792 | 72,404 |
| 12m., Feb., '19 | 7,890,219 | *§5,299,376 | 2,590,843 | 2,232,500 | 358,343 |
| 12m., Feb., '18 | 6,240,740 | *§3,745,515 | 2,495,225 | 2,145,385 | 349,840 |

* Includes taxes. ‡ Includes non-operating income. § In February, 1919, $20,607; February, 1918, $17,322; twelve-months, 1919, $546,010; twelve months, 1918, $215,600, included for depreciation. †Deficit.

# Traffic and Transportation

## Los Angeles Wants Help

### Commission Has Increased Fare Applications Before It From Both Companies There

The applications of the Pacific Electric Railway to increase fares at Los Angeles, Cal., to increase local fares in certain communities outside of Los Angeles, and to increase the minimum fare between interurban points, was scheduled to be heard by the California Railroad Commission, at Los Angeles, on April 29.

### WANTS EIGHT-CENT FARE

In lieu of the present 5-cent fare in Los Angeles, the company wants to establish a downtown zone, the extremities of which shall not be more than 1½ miles from the Pacific Electric's Main or Hill Street Stations, with a cash 5-cent fare and a blanket 8-cent cash fare to, from and within the balance of the present 5-cent zone. The company also requests authority 'to issue a coupon book of twenty tickets to be sold for $1, the book to be transferable, limited to ten days from date of sale and to provide two trips daily during such period.

Glendale, Long Beach, Pasadena, Pomona, Redlands, Redondo Beach, Riverside, San Bernardino, San Pedro-Wilmington, Santa Ana, South Pasadena and Santa Monica-Ocean Park-Venice-Playa del Rey are the outside communities that have street-car zones. At these points the company proposes to substitute for the present 5-cent fare a cash 7-cent fare and to place on sale a twenty-coupon book for $1, subject to the same provisions as at Los Angeles.

The railway has also asked permission to advance the present minimum for interurban fares from 5 cents to 7 cents a single trip, and from 10 cents to 14 cents for round trips. This change, if brought about, will have the effect of correspondingly increasing the local fares within certain cities and communities where these minimum fares now prevail.

It is also proposed to increase forty-ride school tickets from $1 to 1.40.

### INTERURBAN AND CITY APPLICATIONS DISTINCT

The present applications are the outgrowth of a recent petition on the part of the Pacific Electric to make general increases in its interurban and local fares. In a decision rendered on Sept. 4, 1918, the Railroad Commission granted authority to make certain changes in the interurban fares, but no action was taken on the situation at Los Angeles or the outside communities, owing to the fact that the attorneys for the city of Los Angeles and the other communities objected to any change in fares until the entire situation could be studied and corrected on a uniform and non-discriminatory basis.

In support of its applications, the company has filed with the commission a statement of operations for the calendar year 1918, showing a net loss to the company of $1,695,143. It is declared that revenues realized by the advances in fares recently granted, together with increased revenue for freight service authorized by the California Commission and the Interstate Commerce Commission, are insufficient to meet the company's fixed charges and operating expenses and the statement is made that the increases proposed from fares will be applied to meeting annual fixed charges and operating expenses, which have greatly advanced, due to increased costs of operating materials and by reason of advances in wages to employees.

The Los Angeles Railway Corporation now has before the commission an application to increase fares over its lines. The combined applications, therefore, place the entire situation of fares within the city of Los Angeles before the commission for adjudication.

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## Public Service Explains Zoning Plan

Beginning on April 25, at the conclusion of the 7-cent fare hearings, the Public Utilities Commission of New Jersey continued the hearings on the proposed zone system of the Public Service Railway. To expedite the matter, counsel for the commission, the railway and the municipalities agreed that the entire report, which was abstracted at length in earlier issues of this paper, should be admitted as a single exhibit, only fragmentary details being explained by witnesses.

Portions of the report were explained by Thomas N. McCarter, president of Public Service, and Dr. Thomas Conway, Jr., who had been retained by the zoning committee as expert adviser. M. R. Boylan, general auditor of the company, told how the results of the traffic check had been compiled and described the accounting system evolved to care for the preliminary and final classifications.

On April 30, Dean Mortimer E. Cooley, was recalled to the stand for cross-examination. He explained the basis of the appraisal of the property made by him in 1915. He said that in fixing unit costs he had, as was customary with him, averaged costs of material and labor over a five-year period. The figures were taken from the company's books and from vouchers showing actual expenditures.

## Seven Cents in Scranton

### Company There Has Been Charging Eight Cents—Inventory as Basis for Future Charge

In a decision rendered by the Public Service Commission of Pennsylvania on April 23 the Scranton Railway is directed to establish a 7-cent fare on its lines, with a 6¼-cent fare when four tickets are purchased.

The 7-cent fare is to continue in force for one year and the 6¼-cent rate for six months, and then to be modified according to the results in revenue, which actual experience demonstrates. W. D. B. Ainey, chairman of the commission, wrote the opinion. He finds that the Scranton Railway is in all probability greatly over-capitalized.

The company has been charging 8 cents since last September. It established a 6-cent fare in March, 1918. The order of the commission provides:

> The Scranton Railway is to file with the Public Service Commission, not later than May 7, 1919, a tariff schedule, effective on one day's prior notice providing for a 7-cent rate of fare to remain in force for the period of one year, and concurrently for a period of six months; a 6¼-cent rate of fare where coupon tickets in blocks of four are purchased, which tickets shall be put on sale by respondent at its offices and with its conductors, and at the expiration of the six months' period the same to be modified, continued or abandoned by the order of the commission as the intervening experience of the company may warrant; to file with the commission monthly reports of the receipts, expenditures and traffic data.

A valuation of the company's property is to be made. If a valuation conference can be agreed upon between representatives of complainants and the company the commission has announced that it will designate an engineer to sit with them for the purpose of determining the reproduction cost, new and original cost, their report to be submitted to the commission for further consideration.

The commission found that the annual operating expenses were approximately $1,452,932, excluding any items for deferred maintenance; that the number of passengers carried per annum based on the present patronage would be about 23,000,000 and that neither a 5 nor a 6-cent rate of fare would produce sufficient revenue to pay these operating expenses and yield any return to the stockholders. The commission held that the company appeared to be greatly over-capitalized, there being outstanding $2,000,000 of stock and $7,395,500 of bonds, and declined to accept this as a basis for fair return.

Commissioner Ainey said in his opinion accompanying the order:

> It is not disputed that the company is entitled to earn a fair return upon its property devoted to public use. The complainants suggest that if the rate of return be computed upon an estimated value of $4,000,000 at 6 per cent it would allow $240,000 for that purpose. Were we to adopt this basis, although as pointed out the complainants do not attempt to establish it as being the correct amount, it would yield at 7 per cent $280,000, or total required revenue or $1,732,952. The 1917 earnings at $1,529,856 left a deficit of $203,-095. Manifestly a larger revenue is required. Under all the evidence an annual passenger revenue of $1,831,000 is not too much to maintain service and solvency.

# Chicago Surface Fares Five Cents

## Seven-Cent Rate Refused by Illinois Commission, Which Anticipates Deficit of Few Hundred Thousand Dollars at Five Cents

Surface car fares in Chicago are likely to remain at 5 cents. This was indicated by a decision of the Public Utilities Commission of Illinois on April 25 denying the application of the Chicago Surface Lines for a 7-cent fare. The decision held that an increase of even 1 cent would compel the public to pay from $3,500,000 to $4,000,000 more a year for transportation, whereas the commission anticipates a possible deficit of only a few hundred thousand dollars. This amount, it holds, can be met by a cut in the city's profits and a readjustment of allowances for renewals and depreciation.

### One Commissioner Dissented

The commission retains jurisdiction of the case so that it may be reopened at a future date if emergency action be found necessary. Four members of the commission joined in this opinion. Commissioner Lucey dissented. He urged a temporary 6-cent fare to permit needed improvements of the service in the face of existing financial difficulties and suggested that a valuation of the entire system be made in the meantime.

The commission based its decision on the theory that the war-time emergency no longer exists and that any increase in rates must arise from the right to relief under the established rules of law. It held, in brief, that the valuation of $156,481,860 cited by the company represents only the amount which the city would have to pay if it took over the properties as of Aug. 1, 1918, under the terms of the 1907 ordinances.

The 5-cent fare was specified in the 1907 ordinance with this valuation in view, and "if the condition as to fares is disregarded, the provisions as to valuations are not controlling, and the value of these properties, for rate-making purposes, must be determined precisely as if there were no provisions in the ordinances as to the prices at which the city or its licensee may require the properties. The companies will not be permitted to repudiate the condition as to fares and at the same time to insist on this valuation."

### May Overrule 1907 Ordinance Fare

While the commission upheld the city's plea for a 5-cent fare, the city's contention that the rate of fare provided in the 1907 ordinances could not be disturbed was specifically overruled. On this point the commission said:

> It is well settled that a municipality cannot, by a contract in franchise ordinances respecting rates of fare, foreclose the exercise of the police power of the State, unless clearly authorized to do so by the supreme legislative power. * * * There is nothing in the statutes conferring authority upon municipalities of this State, with reference to street railroads, which amounts to a renunciation of the sovereign power of the State, by terms so clear and unequivocal as to remove doubt as to their proper construction.

It is stated that the recent ruling of the United States Supreme Court in the Columbus, Ohio, case has no bearing on similar disputes under the Illinois laws.

### Present Outlook Not So Bad

Taking up the question of valuation for rate-making purposes, the commission then eliminates from the purchase price figures, certain items amounting to $44,100,762, which it says "do not represent property useful and actually used in the public service." These deductions include $9,016,971 of old franchise values; $8,000,000 for paving allowances under the settlement ordinances; $14,794,666 for tangible property replaced during the period of rehabilitation and reconstruction; $8,192,750 allowed under the ordinances for superintendence of construction, and $4,096,375 which has accumulated from allowances specified in the ordinances for bond discount or brokerage. No deduction was made for depreciation, and no allowances were made for goodwill or going value.

In discussing the question of earnings and expenses, the commission pointed out that conditions had changed since the company's petition was filed last November and that the outlook is not nearly so bad at the present time. The companies, for instance, had estimated that their gross earnings for the year ending July 31, 1919, would not exceed $34,000,000. At that time it could not be foreseen that business would pick up as it has in the past few months. The commission believes that "notwithstanding the abnormal conditions of the months of the autumn of 1918," the gross earnings will be about $35,350,000. It says on this point:

> The small receipts for certain months in 1918 did not result from any mismanagement of the properties of these companies; on the contrary, the affairs of the companies appear from the evidence in this case to have been prudently and efficiently managed.

The commission also expresses the opinion that estimates of cost of materials "will not have that degree of permanency which entitle them to be considered as fixed elements in adjusting rates." While cognizance is taken of this outlook, as well as the present high cost of labor under the War Labor Board award, the commission estimates that the companies should be able to operate on a ratio of 76.2 per cent. This would leave net earnings of about $8,500,000. The commission says:

> In determining what is a fair rate of return upon these properties, consideration must be given to the fact that the investment is safeguarded by the provisions of the Mueller law and of the settlement ordinances, which make it necessary for any other company obtaining franchises from the city at the expiration of franchises of the petitioners to take over the properties at the valuation fixed in case the city purchases them.

Taking the estimate of $8,600,000 of net earnings for the current year, the commission says this represents a return of 7 per cent upon $123,000,000 and of 5½ per cent upon the $156,000,000 capital account of the companies, and that it will be sufficient, after making allowances for the division with the city of the excess over the 5 per cent allowed to the companies on the capital account, to meet the interest on their bonded debt. Finally upon the question of ultimate relief in the event that this should be required, the commission says:

> This increased burden should not be placed on the public when there are other and obvious measures of relief against either reduction of wages or a receivership. The settlement ordinances provide for a commutation of the city's share of profits into reduction of fares. Of course, we must assume that the city will exercise control over its profits in such a way as to prevent, on the one hand, injury to the properties in which it has an interest, and, on the other, to avoid a necessity for increasing the burden on the public. And there is a distinction between profits and money actually required to give a fair return on property used in the public service. The commission would not be justified in imposing a burden of $3,000,000 or $4,000,000 upon the people of Chicago, in order to make up a deficit of a few hundred thousand dollars for which provision can be made through a commutation of the city's profits and a readjustment of allowances for renewals and depreciation.

### An Emergency Does Exist, Says Dissenter

In his dissenting opinion, Commissioner Lucey insisted that present conditions constitute an emergency for the companies and that the efficient and continuous operation of the surface railway system is of vital necessity to the business life of Chicago. In this connection he said:

> Unless state regulatory bodies take a liberal view of the necessities of utility corporations serving the public, and permit them to earn sufficient money to pay a fair rate of return and keep their plants in an efficient and first-class condition, state regulation, which is now on trial in many states, may not prove as successful as municipal disorder has proved in the past. The city of Chicago as a governmental agency should be more interested in preserving present conditions than in confronting a chaotic condition of affairs, wherever the responsibility for the same may be ultimately placed.

The petition of the Chicago Surface Lines for a 7-cent fare was filed with the commission on Nov. 21, 1918. Hearings were held up to Feb. 14 when the case was taken under advisement. There have been rumors that the company would go back to its old wage scale for trainmen under a contract which still has more than a year to run.

The War Labor Board scale of 43 cents to 48 cents is now being paid, but the company has the right to abandon this with the coming of peace. The trainmen's organization has taken the position that the company is entitled to a reasonable return which will enable it to continue the wage scale that is now in force.

The Chicago Elevated Railways have been collecting a 6-cent fare since Nov. 19, 1918, under authority of the State commission. The city is inclined to ask that the 5-cent fare be restored on these lines, but the present rate is likely to continue on the Elevated at least until Dec. 1.

## Syracuse Results Poor

### Company Has Been Charging Six Cents, but Now Wants Additional Cent for Transfer

The New York State Railways has asked the Public Service Commission for the Second District, as a means of increasing its revenues to the extent that it will be able to carry on a track and pavement reconstruction program in Syracuse this year:

> That for a period of one year the company be permitted to collect 1 cent for each transfer issued.
>
> That the proceeds from the sale of transfers be placed in a special fund in the bank, and
>
> That the proceeds from the sale of transfers be spent entirely for reconstruction of tracks and pavements in the city.

The railway's application was filed by B. E. Tilton as vice-president. A hearing will follow.

#### WANTS TRANSFER CHARGE

The company alleges that its rates are insufficient to yield a reasonable compensation for the services rendered and are unjustly and unreasonably low and do not allow a reasonable average return upon the value of the property used in the public service and do not provide sufficient income for surplus and contingencies. It asks the commission to determine that a 6-cent fare with 1 cent for a transfer is a just and reasonable rate in Syracuse.

The increase asked, according to the petition is required to carry on necessary and important work and improvements. The company says on April 3 the city notified it of contemplated paving and resurfacing on certain streets this year in which the company's tracks are located, at an estimated cost of $356,600 for resurfacing and $109,000 for new paving between tracks.

#### COMPANY'S CREDIT IMPAIRED

The company, it is stated, is not able to raise money to carry on the construction work other than through its receipts, and these, with present operating expenses, it is claimed, are not sufficient to pay the fixed charges. Under these conditions, the company says it is not possible for it to undertake the reconstruction work at this time.

The company says the result of 6-cent fare operations in Syracuse since Dec. 2 shows this increase in revenue:

| | | |
|---|---|---|
| December | $22,467 | 13.22 per cent |
| January | $32,764 | 20.29 per cent |
| February | $31,813 | 21.65 per cent |
| March | $34,072 | 21.10 per cent |

It is further set forth that these increases have not, in spite of rigid economies, met the increase in operating expenses, due to higher costs of materials and higher rates of wages granted under the decision of the War Labor Board, that the results of operations for December, January and February under a 6-cent fare have not enabled the company to earn its fixed charges and this in spite of mild winter when operating expenses were comparatively low. Losses for December, January and February are given as follows:

| | |
|---|---|
| December | $15,111 |
| January | 5,744 |
| February | 12,537 |

The railway company says the streets upon which improvements are contemplated are in need of resurfacing, and if it is permittted to charge 1 cent for a transfer the work can be carried on and the improvements made. With present revenues the company says it cannot undertake any reconstruction work this year.

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## Public Service Seven-Cent Fare Case Closed

After extended hearings on the application of the Public Service Railway, Newark, N. J., for permission to increase its rate of fare to 7 cents, plus 1 cent for a transfer, the oral testimony was brought to a close on April 25 and the railway and F. H. Sommer, for a number of municipalities, filed briefs summarizing the case on April 29. In the briefs the railway holds that the rate asked for is necessary if safe, adequate and proper service is to be given, while the municipalities endeavor to show that advanced rates sought exceed the value of the service to the short-haul rider.

The company showed the payment of moderate dividends during 1917 was justified in the maintaining of its credit. In the following year operating costs mounted to unheard of figures, necessitating immediate relief. It was not until July 10, however, that permission to charge 1 cent for a transfer was granted. It was held at that time that this additional revenue would permit the company during 1918 to earn its fixed charges and its operating expenses, including $800,000 for depreciation, no return being allowed on stockholders' investments, because the commission thought that the company could temporarily get along without any new capital. Immediately thereafter a ruling of the National War Labor Board caused a further great increase in operating expense and permission was obtained to increase the fare to 7 cents, with 1 cent for a transfer, from Oct. 15 to April 1, 1919, on which date the fare was to be reduced to 6 cents.

In 1918 the railway company spent in operating expenses and fixed charges every cent collected from fares. Allowing for rational and proper expenditure for operation and maintenance, including depreciation but nothing for dividends, the estimates show that even with the 7-cent fare there will be a deficit. The company petitioned that the new rate be made effective from May 1.

In his brief Mr. Sommer called attention to the fact that if the pending application is granted the company will have been allowed to charge five different rates of fare within a period of eleven months.

## Seven Cents in Worcester

### Conditions that Led Massachusett Commission to Sanction that Rate In Its Recent Decision

A 7-cent fare unit was establishe on the Worcester (Mass.) Consolidate Street Railway on April 14 by decision of the Public Service Commission. The board required the company however, to place tickets on sale at th rate of ten for 65 cents, good in al fare zones and sold by conductors. A increase of 33⅓ per cent in existin workingman's tickets was also established by the decision. The compan desired to put a flat 7-cent fare uni into effect on its system and to increase workingmen's ticket rates 40 pe cent. The commission believes fro experience on other properties tha about 60 per cent of the traffic will b handled on the reduced-rate ticke basis.

#### SIX CENTS NOT ENOUGH

The Worcester company operates 290 miles of single track, about 80 mile of which are located in the city o Worcester. These city lines contribut about 71 per cent of the total passenger traffic. Thirty cities and towns ar served, with a population of 358,005 i 1915. Until July 1, 1918, the company had a 5-cent fare, with the railway divided into zones of varying lengths. On that date a revised tariff went into effect, without opposition, substituting a 6-cent fare upon all zones outside Worcester, and on Aug. 1, 1918, a tariff became affective, also without opposition, changing the fare in Worcester to 6 cents.

In January, 1919, the company filed a tariff with the commission making the charge in each zone uniformly 7 cents, proportionally increasing the rates for pupils' tickets, and fixing a 40 per cent increase on workmen's tickets, these last not having been increased before.

It appeared at the public hearings on the present application that the increases in payrolls made by the company since 1914 represented an additional cost for every passenger carried of about 1.07 cents. The company has paid dividends every year since 1887 until 1918, when no dividends were were paid. The average earnings on the total stock investment was 4.57 per cent. The commission found that the company has been conservative in its accounting and that until recently the property has been well maintained. The company estimated that since 1914 the following increased costs per passenger among others have resulted: payroll, 1.07 cents; materials and supplies, 0.239 cents; power, 0.323 cents.

#### INCREASE IN REVENUE VERY SMALL

The increase in revenue under a 6-cent fare from Aug. 1, 1918, to the end of that year, excluding October on account of the influenza epidemic, was 7.6 per cent as compared with the same months of 1917 when the 5-cent fare was in effect. Upon all the evidence the commission is of the opinion that the company is entitled to an increase above existing rates which will yield at least $400,000. The board believes that general economic conditions associated with the war resulted in a steady decline of traffic wholly apart from the effect of rate increases. The estimated requirements of the company for 1919 are: Operating expenses, $3,033,900; additional depreciation charge, $171,964; interest on funded and unfunded debt, $268,026; taxes and other charges, $182,121; return on stock investment (6 per cent) $429,197; total $4,085,209.

## Providence Men Insistent

The union of employees of the Rhode Island Company, Providence, R. I., at a meeting held on April 28 voted to strike unless the back wages due them, amounting to $144,000, are paid by May 3.

Presiding Justice Tanner in the Rhode Island Superior Court last week issued an order directing the receivers of the Rhode Island Company to make the payment, the employees having threatened to strike unless such a decree was entered.

The reason for the latest action of the carmen was explained by Business Agent Coleman. He stated that under the law other creditors in the same class with the employees have thirty days in which to file an appeal from the decision of the court, but as the carmen have waited for several months for the payment of the back wages, they do not propose to permit the payment to be delayed further. It is their belief that if there is to be an appeal from the court's decision by any of the creditors, such an appeal could be filed immediately and a hearing given by the court, thus expediting the matter and removing any obstacles to the receivers carrying out the court's decree and making the payment.

If the payment is not made by May 3, it is the intention of the union men to give the public twenty-four hours' notice of their purpose to strike. If the union adheres to this program the strike will become effective on May 4.

## Court Allows Six-Cent Fare

Kansas City, Kan., and Rosedale citizens are paying 6 cents on the cars of the Kansas City (Mo.) Railways operated in Kansas. A temporary restraining order against the Public Utilities Commission, the Attorney General of Kansas and the cities of Kansas City, Kan., and Rosedale, enjoining them from interfering with it in charging and collecting a 6-cent fare in the two cities was granted the railway on April 15 by Judge John C. Pollock in the federal court at Topeka. Under the court decree the company is required to issue to each passenger paying a 6-cent fare a receipt, reciting that the fare is conditional on the final outcome of the litigation. The application of the railway for an interlocutory injunction was set for a hearing on April 24.

The restraining order, removes the entire 6-cent fare litigation, pending since last May, to the Federal Court. The city officials have maintained that they were the proper authorities to pass on any increase applications, basing their claims on the fact that the city was a party to a contract with the company. The State Supreme Court ruled that the Public Utilities Commission had jurisdiction in fare increase matters. Under this decision the commission recently denied an appeal for an increase.

The order fixing the fare at 6 cents was issued by Judge Pollock on the application of the railway which stated that by reason of the refusal of the Public Utilities Commission to allow it to charge 6-cent fares the company was suffering great financial loss.

# Transportation News Notes

**Fare Hearing Postponed.**—The State Public Service Commission of Washington has set May 14 as the date of hearing on the increase of fare on the Seattle & Rainier Valley Railway, postponing the date from April 23. The railway has filed a schedule increasing fare in the city limits to 7 cents, with 1 cent extra for each transfer.

**Restraining Order in Fare Case.**—Circuit Judge S. G. Houghton, recently issued a preliminary mandatory injunction restraining the Saginaw-Bay City Railway from putting in effect its proposed 6-cent fare in Bay City and compelling the continuance of the operation of its cars. The company notified the Council some time ago to the effect that it would increase its rate of fare to 6 cents commencing on April 18.

**Must Abide by State Rate.**—Judge C. W. Sessions has filed in the eastern district of Michigan a decision dismissing the action of the Michigan Railway, Jackson, Mich., seeking to absolve it from the provision in its charter requiring it to observe the 2-cent fare law. The court holds that the Michigan Railway never was under federal control and that it is bound by the provisions of its charter, in which the 2-cent fare law is incorporated.

**Traffic Check in Kansas City.**—The Kansas City Railways has adopted the "origin and destination basis" checking system in use in Chicago, Philadelphia, and the State of New Jersey. Seventy checkers have been engaged to work upon suburban cars before the canvass is extended to the business district. The work will be under Major H. F. Mayer, recently released from military service. When a passenger boards a car he will receive a card upon which to write his destination. Cards will be collected as passengers leave the car. The count will be repeated several times on each line so that an accurate approximation of the travel on the different lines may be made.

**Seven-Cent Zones Denied.**—The application of the Bridgeton & Millville Traction Company, Bridgeton, N. J., for authority to increase its passenger rates in each fare zone from 5 cents to 7 cents has been denied by the Board of Public Utility Commissioners, but an order has been issued allowing the company to file an amended tariff providing for a 6-cent instead of a 5-cent fare in each zone. The fare zones are each 2 miles long and under the 5-cent fare the company charged 2½ cents a mile. This is said to be the highest electric railway rate per mile in New Jersey. Under the 6-cent fare, the rate per mile is increased to 3 cents. Increases in freight rates are also allowed the company. The commission was prompted to allow the 6-cent fare because the evidence in the cause clearly shows that the company is not earning sufficient revenue.

**New Transfers in Kansas City.**—The Kansas City (Mo.) Railways will change on May 4 from the transfers now in use, which have not proved satisfactory, to the one in use generally some years ago. When a transfer is given it will be punched to the first change of cars, and, if the holder wishes another it will be given him in exchange for the first one issued. The transfers will contain a list of intersections and the passenger will be obliged to state at which street he wishes to change to another line. This street will be punched and the transfer will be good at no other street. It will be good for any line at that intersection, but not for a return trip. Upon the second transfer, the number from which the original was issued will also be punched, so that a record can, in this manner, be kept of all traffic and transfers. The directions will be noted by colors. The new transfer will be an inch longer than the one now in use.

**Seven-Cent Fare Asked in Memphis**—Declaring that present revenues from the 5-cent fare are inadequate to meet increased cost of production the Memphis (Tenn.) Street Railway, through Receivers Frank Elgin and T. H. Tutwiler, has petitioned Federal Judge John E. McCall for permission to apply to the new State Railroad and Public Utilities Commission for a 7-cent cash fare and 1 cent for each transfer. Judge McCall has since authorized the company to proceed and the petition will be presented in a few days. The deficit of the company in 1918 was $225,000. A special plea will be made for the Raleigh line to be allowed to charge an additional cash fare beyond the town of Binghampton. Heretofore the fare from Memphis to Binghampton has been 5 cents with an additional nickel from the Macon Road to Raleigh. By act of the Legislature which adjourned recently the town of Binghampton, except for its manufacturing surburbs, will become a part of the city proper soon.

# Personal Mention

## George P. Toby to London

### He Is Appointed Executive Secretary to the American Chamber of Commerce in that City

George P. Toby, long connected with banking and industrial corporations in this country, has been appointed executive secretary of the American Chamber of Commerce in London and will sail for his new post about May 12, meanwhile conferring with American merchants as to the service which the American Chamber in London can render them. Mr. Toby has been long known as an investment banker, and in this capacity has made a careful study of the operation of American industrial and public utility corporations.

### MR. TOBY WELL QUALIFIED

Mr. Toby spent more than a year in Washington during the war on work for the Treasury Department and on plans for co-operation between the various government departments and the business world. His banking interests brought him to a close study and investigation of the commercial possibilities of industrial corporations, including studies of the markets for products, methods of distribution, etc. These activities also have taken him to every part of the country, giving him therefore a broad sympathy with every section of the United States. He also has the advantage of having traveled extensively in Europe and Canada.

G. M. Cassatt, president of the American Chamber of Commerce in London, who is now in the United States, in announcing the appointment explained that the London organization has as its members the representatives in England of American manufacturing and exporting interests, and also of the foremost British manufacturers and exporters, too, and importers from the United States. The former are active members, the latter associate.

### PREPARED FOR INQUIRIES

The Chamber has standing committees on finance, commerce and trade, transportation, trade information, etc., and the membership is also divided by businesses into trade groups, each working through its own committee. Thus almost any inquiry can be expeditiously handled by referring it to the proper committee or proper trade group. The London Chamber desires that the individual American manufacturer, merchant, exporter from one end of the country to the other should learn to look upon the chamber as an overseas service bureau of his own—ready to promote American business.

**H. O. Allison**, Beaver, Pa., has been appointed safety engineer of the Beaver Valley Traction Company, New Brighton, Pa. He assumed his new duties on April 1. Mr. Allison at the time of his selection was special inspector and assistant to the chief of the inspection bureau of the Associated Bureaus, Pittsburgh Railways, with headquarters at Pittsburgh, under the direction of Cecil G. Rice. A service bureau has been established by the Beaver Valley Traction Company to handle all complaints, service suggestions and accident prevention measures. Mr. Allison was associated with *The Daily Times* of Beaver, Pa., for six years prior to 1917 as general manager and secretary-treasurer. Twelve years ago he went to Beaver County from Ohio and a few months afterward became associated with *The Times* as advertising manager. Shortly afterward he assumed complete charge of the paper. It was while in charge there that he first brought his views of transportation facilities to the attention of W. H. Boyce, superintendent of the Beaver Valley Traction Company. After several consultations with him an extensive publicity campaign for the prevention of accidents and a better public understanding was begun. The success which attended what was then a new feature to electric railways was such that publicity has become a regular feature in connection with the Beaver Valley Traction Company. The service bureau of which Mr. Allison will now become the active head will not be an experiment, as many of its details have been in effect for some time, but in the present appointment it is the desire of Mr. Boyce to make it more complete under a supervision that will result in even a better service and less chance for accidents. The employment of new men will be a feature of the bureau.

H. O. ALLISON

**Charles L. Tutt**, secretary and treasurer of the Grand River Valley Railway, Colorado Springs, Col., when he went into service last September, resigned as secretary and treasurer of the railway, but the resignation was not accepted, and J. A. Hull was elected as assistant secretary and treasurer. Mr. Tutt has returned from military duty and has resumed the duties of secretary and treasurer. Mr. Hull has resigned.

**W. A. Carson**, who is vice-president and general manager of the Evansville & Ohio Valley Railway, Evansville, Ind., was elected as one of the two vice-presidents of the Y. M. C. A. State Association at the recent convention. Mr. Carson was chosen for this position because of his good record in the Y. M. C. A. work in Evansville, and because it is customary for the railroad world to be represented on the board of the Y. M. C. A.

**M. J. B. McConnell**, for the last year division superintendent of the Steubenville, East Liverpool & Beaver Valley Traction Company, Steubenville, Ohio, has been made general superintendent with headquarters at East Liverpool, Ohio. Before going to Steubenville Mr. McConnell was connected with the New York State Railways, Rochester Lines, as chief clerk to the general manager and later as assistant engineer of maintenance of way.

**D. H. Braymer**, formerly editor of the *Electrical Record*, has been appointed managing editor of the *Electrical World*. Mr. Braymer, prior to becoming editor of the *Electrical Record* in 1917, was for two years engineering editor of the *Electrical World*. Before that he was editor of *Electrical Engineering* of Atlanta, Ga., and of its successor, the *Southern Electrician*. Mr. Braymer was graduated from Cornell University in 1906, with the degrees of A.B. and E.E.

**Lieut.-Col. W. R. Thompson**, manager of construction and engineering of H. M. Byllesby & Company, Chicago, Ill., landed in New York from overseas recently. Colonel Thompson has been in uniform since completion of the second officers training camp at Fort Sheridan, from which he was sent as an instructor to Deming, N. M., commissioned as captain. Later he was made a major and sent to France with the 109th Engineers. About the time the armistice was signed he was promoted to the rank of Lieutenant-Colonel in the same regiment.

**William A. Sullivan** has announced his resignation as manager for the Shreveport (La.) Railways and his acceptance of the general managership of the Gulfport & Mississippi Coast Traction Company, which controls city, interurban and electric lighting companies in and between Pass Christian and Biloxi, Miss. Mr. Sullivan has been manager of the Shreveport Railways for the last nine years. He was formerly with Ford, Bacon & Davis, at Birmingham and Little Rock. Under his direction the Shreveport Railways ncreased from 13 miles of track to 33 miles. Mr. Sullivan was also secretary-treasurer of the Shreveport Baseball Club and was active in Texas League affairs.

**J. C. Rockwell** has been promoted from local general manager to vice-president of the Manila Electric Railroad & Light Company, Manila, P. I., in charge of the general Philippine affairs of that company. Mr. Rockwell was graduated in 1904 from Cornell University with the degree of mechanical engineer. Following his graduation he engaged in track construction work. In 1906 he became superintendent of transportation of the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y. He was appointed general superintendent in 1909 of the Charleston (W. Va.) Interurban Railroad, and the following year was elected general manager of that company. In 1911 he joined the operating organization of The J. G. White Management Corporation, New York, N. Y., and was assigned to the Manila Electric Railroad & Light Company as manager of the light and power department. He was made general manager of that company in the early part of 1918.

J. C. ROCKWELL

**John B. Crawford** has been appointed general superintendent of the Concord & Manchester electric branch of the Boston & Maine Railroad, Concord, N. H. Mr. Crawford was formerly connected with the Middle West Utilities Company, Chicago, in the capacity of district superintendent of its various subsidiary companies. He is very well known in the East, having entered electric railway work in 1895 on the Hartford (Conn.) Street Railway. His experience since then has included some light, power and transmission work, but has been mostly in the railway field. Among the systems with which Mr. Crawford has served in various capacities are the Lexington & Interurban Railway, Lexington, Ky.; Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.; Winona Interurban Railway, Warsaw, Ind. and the Groton & Stonington Street Railway, New London, Conn.

**Dr. William McClellan** has resigned as dean of the Wharton School of Finance and Commerce of the University of Pennsylvania. He has announced that he has no other plans than to resume his relations with the firm of McClellan & Campion, with offices in New York and Philadelphia. Dr. McClellan was born in Philadelphia and was graduated from the Arts Department of the University of Pennsylvania. In 1903 he obtained the degree of Doctor of Philosophy and in 1914 the university presented to him the degree of Electrial Engineer. He was engineer in charge of construction of the Philadelphia Rapid Transit Company, supervising engineer with Westinghouse Church, Kerr & Company and in 1907 associated himself with H. T. Campion, Philadelphia, in the engineering business. He also served for a time as electrical engineer and chief of the division of light, heat and power of the Public Service Commission for the Second District of New York.

**S. R. Dunbar**, purchasing agent of the Union Traction Company of Indiana, Anderson, Ind., has resigned effective on May 15. Mr. Dunbar became associated with the Union Traction Company sixteen years ago as storekeeper. After being employed in this position for six months, he was promoted to the position of purchasing agent for the company. He held this position for two years and was then made general passenger agent, from which position he resigned after one year and went to Boston to engage in business. Mr. Dunbar returned to Anderson in 1907 as head of the purchasing department of the traction line and has retained this position since that time. He has also for the last year and one-half been editor of *Safety* a magazine published by the railway in the interest of the employees. Mr. Dunbar desired to change the exacting nature of his duties, but has made no decision as to what he will do in the future.

**Capt. Howard H. George**, formerly of the Fifty-fifth Engineers, A. E. F., has recently returned from France and has resumed his former position as assistant engineer with the Public Service Railway, Newark, N. J., having received his discharge from the service. Captain George is a member of the American Society of Civil Engineers and was commissioned in the Engineer Officers' Reserve Corps on Jan. 16, 1917. He was among the first civilian engineers to be commissioned in the army, and was ordered to active duty in May, 1917, subsequently serving eight months with the 305th Engineers, 80th Division. Later he was transferred to the Fifty-fifth Engineers, with which unit he went to France. The battalion of this regiment to which Captain George belonged was first engaged in the construction of a large ammunition dump, and later, along with several other units, on the large storage depot at Montierchaume. This project involved the construction of more than 400 miles of trackage, comprising receiving and departure yards, inbound and outbound classification yards, storage grids, many large steel and frame storage warehouses, barracks and officers' quarters for several thousand troops, an engine repair shop and other work of a miscellaneous character. Captain George was engineer officer in charge of all building construction on this project. He was finally transferred for duty with the Base Section Engineer at Le Havre, where he was stationed when the signing of the armistice stopped practically all construction work in the Service of Supplies and he received his orders to return home.

**R. W. Spofford** has been appointed local general manager of the Manila Electric Railroad & Light Company, Manila, P. I. Mr. Spofford was graduated from the United States Naval Academy at Annapolis, and spent about five years in the navy. He was retired in 1911. Shortly thereafter he was engaged by The J. G. White Management Corporation and was assigned to the staff of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga. Later he was made general manager of that company. When the United States entered the World War, Mr. Spofford, as a Naval Reserve officer, was called to the colors for service. With the signing of the armistice he was again placed on the retired list of the Navy, with the grade of lieutenant-commander.

R. W. SPOFFORD

**Patrick F. Sheehan**, for the last seventeen years president of the Brockton branch of the Amalgamated Association of Street & Electric Railway Employees of America, has been made assistant division superintendent of the Bay State Street Railway, Boston, Mass., with headquarters in Brockton, Mass. He succeeds John T. Conway, Quincy, who has been made manager of the Hyde Park division, succeeding Thomas Gammons, resigned. Mr. Sheehan automatically severed his official connection with the union upon entering on his railway duties. He has been a leader in the State branch of the American Federation of Labor.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Slack Adjusters Finding Fair Market

### System of Trial Equipments Bringing Considerable Resales—No Price Changes Reported

Sales of slack adjusters, manufacturers report, are running in the neighborhood of 30 to 40 per cent of normal. Among the traction companies which are equipping their rolling stock with these accessories, is one prominent road in the East which, whenever a truck goes into the shop for overhauling, equips it with slack adjusters, provided it was not so equipped previously. This method spreads the cost over a considerable period of time and does not take the truck out of service to make the installation. Of course any repair work and replacements of adjusters which may be necessary are cared for as they appear.

Where adjusters are not employed the turnbuckle used to overcome wear on the brakes must be examined and set by hand periodically, sometimes as often as once a day, depending on the braking characteristics of the run. The necessary labor is appreciable and cases have been found where one pitman may be eliminated for approximately every 40 cars in service when slack adjusters are used. With their use it is only necessary to readjust the mechanism when the worn out brake shoes are replaced. Tests also show approximately 20 per cent increase in the life of the shoe.

THE FOLLOWING TABLE GIVES AVERAGE PRICES FOR SOME RAILWAY SCRAPS IN DIFFERENT SECTIONS OF THE COUNTRY

| | New York | Philadelphia | Chicago | Cincinnati |
|---|---|---|---|---|
| Heavy melting steel scrap, G. T. | $12.50 | $15.50 | $16.25 | $15.75 |
| Old iron axles, G. T. | 22.75 | 24.00 | *24.00 | 22.75 |
| Old steel axles, G. T. | 22.50 | 24.50 | *27.00 | ...... |
| Old car wheels, G. T. | 22.50 | 24.00 | 22.50 | 19.25 |
| Steel rails, re-rolling, G. T. | ...... | 17.50 | 17.25 | ...... |
| No. 1 R.R. wrought, N. T. | 20.00 | 21.50 | 15.75 | 16.25 |

*Net tons

A number of traction companies are purchasing sufficient sets of adjusters to equip a few cars on trial. Results are shown in the number of resales made through this method. One manufacturer with a curtailed sales force finds that most of his sales are resales from trial installations.

But little factory stock of complete equipments can be kept because of the number of varieties of car trucks in use. Certain parts which are adapted to virtually any style of truck, however, can be stocked. Depending upon the size of the order deliveries can be made by the manufacturers in from one to four weeks. So far as could be learned there have been no changes in price this year.

## Little Movement of Scrap Iron and Steel

### Settlement of Steel Controversy Will Probably Increase Activity—More Scrap Used Than Formerly

Present conditions in the scrap iron and steel market are extremely quiet. This market reflects the new steel and iron market to a great degree, and when a solution to the present steel controversy is found it is expected that the activity of the steel interests which it is reasonable to assume will follow, will cause a corresponding activity in the scrap market.

After the price suggestions of five weeks ago the scrap market picked up in good shape. The demand became better and prices showed an advance of $1 to $1.50 a ton on nearly all grades. Then the prices and the demand fell off and both buyers and sellers assumed a waiting attitude.

Scrap is rather a local proposition and seldom moves any great distance. The Pittsburgh district is a heavy consumer of scrap iron and steel and cannot always provide sufficient for its own uses. There is a shortage in supply in this district and little demand from consumers. Dealers, however, would heavily stock the material if much were forced on the market.

Larger proportions of scrap than formerly are now being used by most mills, except where specified amounts of pig are required. This pig is approximately $10 a ton higher than heavy melting steel.

## 200 Safety Cars for B. R. T.

The Brooklyn (N. Y.) Rapid Transit Company and the Public Service Commission have come to an agreement whereby 200 safety cars will be purchased for operation on these surface lines. The original order of the commission was for 250 new cars. Two orders of fifty center-entrance trail cars have already been placed. The Commission has approved the operation of the twelve safety cars which have been tried out on the lines with the result that the decision has been reached to order 200 additional cars of this type, making a total of fifty more cars than originally specified.

## Improvement in Southern Market Coming

### While Buying Has Been Light for Some Time the Future Appears to Be Decidedly Hopeful

A number of Southern street railroads are passing through the crucible of financial difficulty, chargeable to a protracted period of high material and equipment prices combined with mounting labor costs on the one hand and fixed fares on the other. A few roads that have not been permitted to increase fares have so far weathered these conditions. Others that have secured relief are carrying heavy financial burdens, and with a gradual decline in price levels it is possible that they will be able to pass over the present crisis successfully. Although the Southern street railways do not occupy a unique position in regard to the present-day utility problems, a survey of the field indicates that the financial aspect reflects immediate purchasing power and what may be expected from this quarter in the way of extensions and replacements for the near future. Operators are cognizant of the present needs of their properties, and it is not a question of what to buy but of how long purchases can be postponed until the occasion is more propitious.

### Rotaries and Turbines Needed

Practically no generating equipment has been purchased since the establishment of cantonments made it absolutely necessary in some instances; and while the need is great and a potential market exists for rotaries and turbines, the manufacturers can not hope to close any large transactions for some time to come.

Car equipment over the entire section is badly in need of replenishment, but nothing is being bought outside of a few second-hand outfits. The demand for new motors has almost disappeared and second-hand motors go begging. No price change has been recorded in grid resistances and the volume of sales appears to be picking up. Rails and spikes are dull. Deliveries are now much easier.

If too much attention is paid to the volume of street railway supply business transacted during the past two years, a feeling of pessimism is bound to prevail; but if, on the other hand, a close study is made of the present and underlying conditions of the street railway field, a brighter outlook will be the result. There is no doubt that in summing up the prospects, a gradual improvement in this region is perceptible.

## General Electric Company's Sales for 1918 Large

### Orders Received in 1918 Aggregate $234,100,000 While Sales Billed Total of $216,800,000

While the totals of orders received by the General Electric Company in 1918 reached large figures, they were not so great as in the preceding year. On the other hand, the amount of sales billed was larger in 1918 than in 1917. The figures compare as follows:

| | 1918 | 1917 |
|---|---|---|
| Orders received.. | $234,134,037 | $246,778,491 |
| Sales billed...... | 216,815,277 | 196,926,318 |

An important feature of the year was the provision of increased manufacturing facilities. Regarding these and the curtailment of production which followed the armistice Mr. Coffin, chairman of the board of directors, said:

"In order to expedite the completion of government and other contracts essential to the prosecution of the war, your company was forced to make heavy expenditures for additional manufacturing facilities. As a result the rate of production had reached the highest point in the company's history when the armistice was signed on Nov. 11, 1918. The cessation of hostilities resulted in suspensions and cancellations of orders, estimated at the date of closing the accounts at $30,000,000, leaving a balance of approximately $80,000,000 of unfilled orders at the end of the year.

"The expenditures for additional land, buildings, machinery and other equipment aggregated $21,593,996. As these facilities were required for the manufacture of apparatus and supplies urgently needed in the prosecution of the war, it was imperative that they be provided with the least delay and under circumstances which made economy of construction impossible.

"In view of the fact that a portion of the recent additions to manufacturing facilities will for a considerable time be unused, and having regard to the high cost of such additions, the sum of $15,224,162 has been written off the plant account, and $3,186,793 will be included in the cost of unfinished contracts."

The total factory floor space in 1918 was 19,581,000 sq.ft., as compared with 17,573,000 sq.ft. in 1917.

## Ball-Bearing Manufacturers Combine

SKF Administrative Company, 5 Nassau Street, New York City, announces a reorganization, effective May 1, whereby the products of the Hess-Bright Manufacturing Company, the SKF Ball Bearing Company, the Atlas Ball Company and the Hubbard Machine Company will be sold through one central organization. The new company, under the name of SKF Industries, Inc., will thereby be able to offer a comprehensive line of ball bearings, including the Hess-Bright deep-groove type, SKF self-aligning radial and thrust bearings and ball bearing pillow-blocks and shafting hangers. Through the medium of its engineering organization, backed up by a well-equipped laboratory, the new company will be able to place at the service of bearing users the knowledge gained in many years' study of anti-friction bearings of all kinds. On request, manufacturers' problems will be analyzed in detail and that type of bearing recommended which (independent of sales considerations) is best suited to the conditions met. In addition, the laboratory staff will carry on research studies affecting anti-friction bearing design and application. The new company—SKF Industries, Inc.—will be under the direction of B. G. Prytz, president; W. L. Batt, vice-president; J. P. Walsh, comptroller, and S. B. Taylor, sales manager. The principal office will be at 165 Broadway, New York City, with branches at Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago and San Francisco.

## Track and Roadway

**British Columbia Electric Company, Ltd., Vancouver, B. C.**—The British Columbia Electric Railway proposes laying a submarine cable across Victoria Harbor for supplying electrical energy for industrial purposes on the Songhees Indian Reserve.

**Visalia Electric Company, Exeter, Cal.**—The Railroad Commission of California recently approved an agreement between the Southern Pacific Company, the Visalia Electric Company, the Minkler Southern Railroad and the Santa Fe Railroad, under the terms of which the Visalia Electric Company agrees to sell to the Minkler Southern Railroad that portion of its line south of the city of Porterville. The Minkler Southern Railroad has agreed to re-

## NEW YORK METAL MARKET PRICES

| | Apr 17 | May 1 |
|---|---|---|
| Copper, ingots, cents per lb.......... | 15 37½ | 15 37½ |
| Copper wire base, cents per lb........ | 17 25 to 18.00 | 17 25 to 18.00 |
| Lead, cents per lb.................... | 5.00 | 5.00 |
| Nickel, cents per lb.................. | 40.00 | 40.00 |
| Spelter, cents per lb................. | 6 45 | 6.40 |
| Tin, cents per lb..................... | †72.50 | †72.50 |
| Aluminum, 98 to 99 per cent., cents per lb.............................. | 31 00 | 31.00 to 33.00 |

† Government price in 25-ton lots or more f.o.b. plant.

## OLD METAL PRICES—NEW YORK

| | Apr. 17 | May 1 |
|---|---|---|
| Heavy copper, cents per lb........... | 13.50 to 13.75 | 13.50 to 13.75 |
| Light copper, cents per lb............ | 11.00 to 11.25 | 11.00 to 11.25 |
| Heavy brass, cents per lb............. | 7.50 to 8.00 | 7.50 to 8.00 |
| Zinc, cents per lb.................... | 5.75 to 5.50 | 5.25 to 5.50 |
| Yellow brass, cents per lb............ | 6.50 to 7.00 | 6.50 to 7.00 |
| Lead, heavy, cents per lb............. | 4.00 to 4.25 | 4.00 to 4.25 |
| Steel car axles, Chicago, per net ton... | $26.00 to $28.00 | $23.00 to $25.00 |
| Old carwheels, Chicago, per gross ton.. | $22.00 to $23.00 | $21.00 to $22.00 |
| Steel rails (scrap), Chicago, per gross ton | $17 00 to $17.50 | $17.00 to $17.50 |
| Steel rails (relaying), Chicago, gross ton. | $17.00 to $17 50 | $17.00 to $17.50 |
| Machine shop turnings, Chicago, net ton | $6.50 to $7.00 | $6.00 to $7.00 |

## ELECTRIC RAILWAY MATERIAL PRICES

| | Apr. 17 | May 1 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb.......................... | 20 | 20 |
| Weatherproof wire (100 lb. lots), cents per lb., New York................ | 23 00 | 23 00 to 23.25 |
| Weatherproof wire (100 lb. lots), cents per lb., Chicago................. | 23.75 to 37.35 | 23.75 to 37.35 |
| T rails (A. S. C. E. standard), per gross ton.......................... | $49 00 to $51 00 | 49.00 to 51.00 |
| T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton.......... | $47 00 to $49 00 | 47.00 to 49.00 |
| T rails (A. S. C. E. standard), 500 ton lots, per gross ton................ | $45.00 to $47.00 | 45.00 to 47.00 |
| T rail, high (Shanghai), cents per lb... | 3 | 3 |
| Rails, girder (grooved), cents per lb.... | 3 75 | 3.75 |
| Wire nails, Pittsburgh, cents per lb.... | 3.25 | 3.25 |
| Railroad spikes, drive, Pittsburgh base, cents per lb.......................... | 3 25 | 3 35 |
| Railroad spikes, screw, Pittsburgh base, cents per lb.......................... | 8 | 8 |
| Tie plates (flat type), cents per lb..... | 2.75 | 2.75 |
| Tie plates (brace type), cents per lb.... | 2.75 | 2 75 |
| Tie rods, Pittsburgh base, cents per lb. | 7 | 7 |
| Fish plates, cents per lb.............. | 3 | 3 |
| Angle plates, cents per lb............. | 3.90 | 3.90 |
| Angle bars, cents per lb............... | 3.90 | 3.90 |
| Rail bolts and nuts, Pittsburgh base, cents per lb.......................... | 4.35 | 4.35 |
| Steel bars, Pittsburgh, cents per lb.... | 2 35 | 2.35 |
| Sheet iron, black (24 gage), Pittsburgh, cents per lb.......................... | 4.20 | 4.20 |
| Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb................... | 5.25 | 5.25 |
| Galvanized barbed wire, Pittsburgh, cents per lb.......................... | 4.10 | 4.10 |

| | Apr. 3 | Apr. 17 |
|---|---|---|
| Galvanized wire, ordinary, Pittsburgh, cents per lb.......................... | 3.70 | 3.70 |
| Car window glass (single strength), first three brackets, A quality, New York, discount †.......................... | 80% | 80% |
| Car window glass (single strength, first three brackets, B quality), New York, discount.......................... | 80% | 80% |
| Car window glass (double strength, all sizes AA quality), New York discount | 81% | 81% |
| Waste, wool (according to grade), cents per lb.......................... | 14 to 17 | 14 to 17 |
| Waste cotton (100 lb. bale) cents per lb. | 8 to 13½ | 8 to 13½ |
| Asphalt, hot (150 tons minimum) per ton delivered.......................... | ..... | ..... |
| Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton.......................... | ..... | ..... |
| Asphalt filler, per ton................. | $30.00 | $30.00 |
| Cement (carload lots), New York, per bbl.......................... | $2.90 | $2.90 |
| Cement (carload lots), Chicago, per bbl. | $3.05 | $3.05 |
| Cement (carload lots), Seattle, per bbl.. | $3.13 | $3.13 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal.......................... | $1.53 | $1.61 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal.......................... | $1.63 | $1.68 |
| White lead (100 lb. keg), New York, cents per lb.......................... | 13 | 13 |
| Turpentine (bbl. lots), New York, ents per gal.......................... | 78 | 78 |

† These prices are f. o. b. works, with boxing charges extra.

construct the road, making it suitable for the operation of steam or electric trains, the new construction to be completed to a connection with the Southern Pacific Company's tracks at Ducor, in Tulare County. The agreement further provides for the joint use of the reconstructed line by all of the lines concerned in the agreement and of the Southern Pacific Company's line between Ducor and the station of Oil Junction, Kern County.

**Topeka (Kan.) Railway.**—Plans have been made by the Topeka Railway for the rehabilitation of its entire system, including track repair, remodeling of cars and improvement of service generally.

**International Transit Company, Sault Ste Marie, Ont.**—A report from the International Transit Company states that it will build about 3,500 ft. of new track and will rebuild about 7,000 ft. of old track.

**St. Catharines, Ont.**—Formal request to the Dominion government has been made by the Ontario Hydro-Electric Power Commission for an order in council authorizing immediate beginning of construction work on two hydro-radial lines, one from Toronto to Bridgeburg and the other from Toronto to London. The two roads will have a total mileage of 250 miles and will cost about $26,000,000.

**Philadelphia, Pa.**—A contract has been awarded by the Department of City Transit to the North American Railway Construction Company, Chicago, for the first six miles of the proposed Frankford-Byberry line. The contract price is $370,892. Bids were opened on April 22 for the construction of the superstructure on the Frankford elevated line from Callowhill Street south to within a short distance of Arch Street. The lowest bidder was the Phoenix Bridge Company, Phoenixville, Pa., at $176,399.

**Reading Transit & Light Company, Reading, Pa.**—The Reading Transit & Light Company is about completing the construction of a new railway bridge over the Reading Railroad Company's tracks at Wyomissing, on the outskirts of the city. The improvement will cost about $4,500 and will make possible a speeding up of the service.

**Forth Worth, Tex.**—It is reported that a survey will soon be begun by Richard Ferris and H. E. Robison, Fort Worth, Tex., of a proposed electric railway to extend between Forth Worth and Mineral Wells.

**Monongahela Valley Traction Company, Clarksburg, W. Va.**—It is reported that the Monongahela Valley Traction Company will construct a bridge over the West Fork River.

**Morgantown & Wheeling Railway, Morgantown, W. Va.**—It is reported that work will be begun soon by the Morgantown & Wheeling Railway on the construction of an extension from Blackville, W. Va., to Waynesburg, Pa., about 14 miles.

## Power Houses, Shops and Buildings

**Little Rock Railway & Electric Company, Little Rock, Ark.**—An addition will probably be built by the Little Rock Railway & Electric Company to its power house in Little Rock.

**Philadelphia (Pa.) Rapid Transit Company.**—A permit has been granted to the Philadelphia Rapid Transit Company for an addition, 22 ft. x 29 ft., to its power plant at 963 Beach Street.

**West Penn Traction Company, Pittsburgh, Pa.**—The West Penn Traction Company will in the near future locate its central carhouse and machine shop in South Warwood, near Wheeling. The plant will cover a space of 10 acres.

**Chattanooga Railway & Light Company, Chattanooga, Tenn.**—Plans are being made by the Chattanooga Railway & Light Company for the reconstruction of its power house on the Lookout Mountain incline which was recently destroyed by fire.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—The Whatcom County Commissioners have granted the Puget Sound Traction, Light & Power Company permission to erect electric transmission lines along the county roads to Ferndale.

## Trade Notes

**W. H. Green** has been appointed Pacific Coast manager of the Chicago Fuse Manufacturing Company, with headquarters in San Francisco.

**Ohio Brass Company, Mansfield, Ohio,** announces that on May 1 its Chicago office moved from 508 Fisher Building to 1217 Fisher Building, 343 South Dearborn Street.

**Holden & White, Inc., Chicago, Ill.,** have been appointed sales representatives for C. I. Earll for the Central and Southwestern states, handling the sale of Earll catchers and retrievers.

**Chas. F. Ames & Company, Ltd., 90 West Street, New York,** has been appointed to act as the New York sales department of the Platt Iron Works, Dayton, Ohio, manufacturers of pumping and power plant equipment.

**Henry M. Sperry,** publicity representative for Union Switch & Signal Company, General Railway Signal Company, Federal Signal Company and Hall Switch & Signal Company, has moved to new offices at 347 Madison Avenue, New York City.

**Blau-Knox Company, Pittsburgh, Pa.,** announces the appointment of J. E. Mason as manager of field sales, in which capacity he will supervise the operation of a wide sales agency plan throughout the country. Mr. Mason was in charge of the Chicago office of the *Engineering News-Record.*

**Van Dorn Electric Tool Company, Cleveland, Ohio,** announces that the new Chicago office is located at 527 South Dearborn Street, and extends through to 528 Plymouth. Wm. Cottrell, sales manager at the Chicago branch, says that the phenomenal increase in business enjoyed by the company is the result of the insistent demand today for mechanical devices of proved efficiency and economy.

**Advance Manufacturing & Tool Company, 1244 St. Clair Avenue, Cleveland, Ohio,** announces that it has recently purchased the assets of the Cleveland Trolley Supply Company, and is now prepared to supply trolley wheels, harps, trolley bases, conductors' seats, window catches, ticket holders, drinking fountains, brush-holders, sleet cutters, or any other product formerly produced or handled by the Cleveland Trolley Supply Company. C. H. Bell is president of the new company and Henry Holland, formerly president of the old company, will remain with the Advance company.

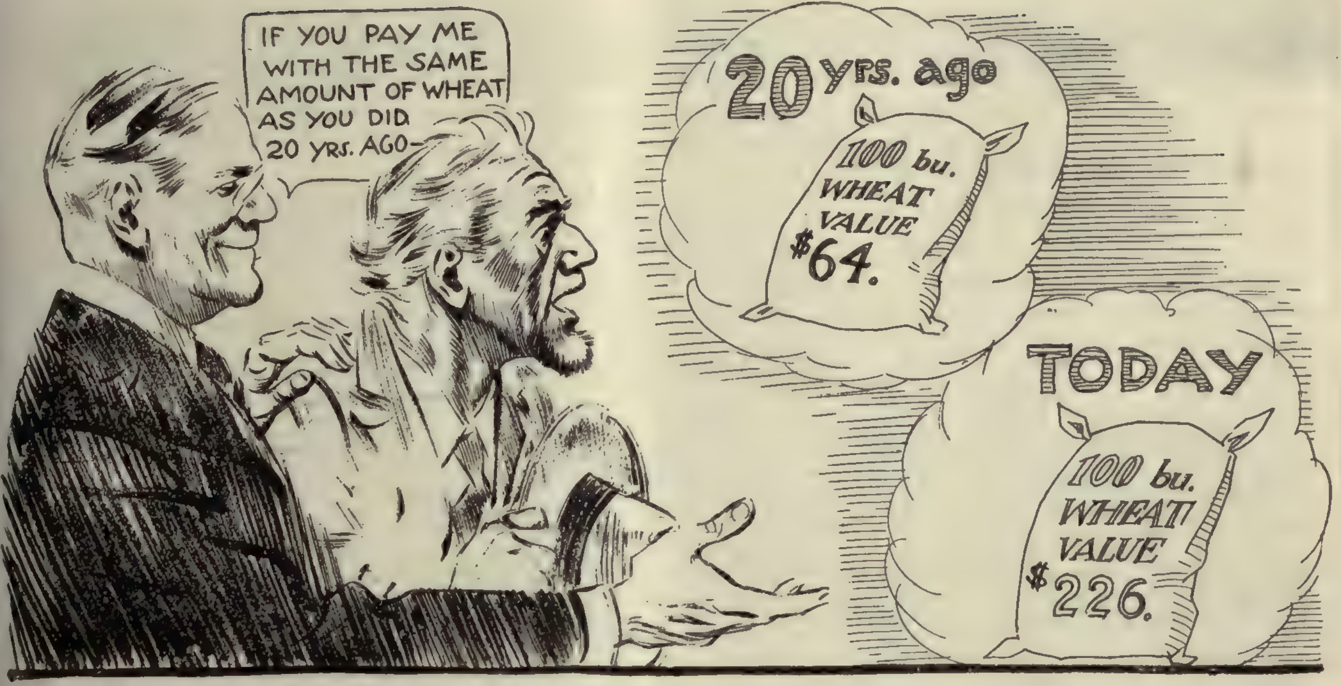
**T. W. Holt,** formerly connected with the Pressed Steel Car Company, Pittsburgh, Pa., has become assistant general manager of the Curtain Supply Company, Chicago, Ill., succeeding the late R. S. Reynolds. Mr. Holt went to Europe in the latter part of 1914 to study foreign conditions and methods of making munitions. Since that time he has had charge of the munition work performed by the Pressed Steel Car Company. He was appointed a member of the committee to represent the forging makers of the country at Washington, and also acted in an advisory capacity for the British Forging Company, owned and controlled by the Imperial Forging Board, Canada. For a period of eight years previous to the war, Mr. Holt has held various executive positions in connection with steam, passenger and freight car construction and fabrication of materials. He has also had charge of wheel foundry, gray iron foundry and malleable foundry operations, having had special training along metallurgical lines.

## New Advertising Literature

**Vulcan Soot Cleaner Company, Du Bois, Pa.:** Bulletin on "Soot Cleaners for Return Tubular Boilers."

**Westinghouse, Church, Kerr & Company, New York City:** Illustrated circular on building with concrete, showing typical buildings of various types.

**Joseph Walker & Sons, New York City:** Circular on the merits of the stock of the Manhattan (Elevated Railway, New York, whose dividend i 7 per cent is guaranteed by the Interborough Rapid Transit Company. I is said that the payment of the dividends on this stock is a prior charge on the Interborough Rapid Transit Company's earnings to its first and refunding bonds, that the lease has alway been a profitable one to the Interborough Company except since July 1918, and that the franchise of th Manhattan Railway does not limit th company to a 5-cent fare.


IF YOU PAY ME WITH THE SAME AMOUNT OF WHEAT AS YOU DID 20 YRS. AGO—
20 YRS. ago
100 bu. WHEAT VALUE $64.
TODAY
100 bu. WHEAT VALUE $226.

# AN ACTUAL INCIDENT WITH A BIG MORAL

A short time ago a farmer asked a buggy manufacturer for a price on a certain type of vehicle.

Upon receipt of the quotation the farmer wrote the manufacturer, accusing him of "profiteering" and similar high commercial crimes and misdemeanors. In justification of his charges he reminded the manufacturer that he (the farmer) had once bought a very similar buggy from the same factory at a price far and away below the price now quoted.

This particular manufacturer operates one of the systematic business concerns that maintain a record of all their transactions.

Upon receipt of the farmer's letter of complaint the manufacturer looked up the previous sale to which the farmer referred.

He found that such a sale had been made as the farmer stated and that the farmer had paid for that buggy not in money but with a shipment of wheat.

The manufacturer thereupon replied to the farmer giving the complete record of the transaction and said: "If you will ship to me for your new buggy the same amount of wheat you shipped for your old one I will gladly ship the buggy and in addition will ship you a piece of household furniture and a good kitchen stove!"

Another actual incident.

During a train conversation a mechanic complained bitterly that he had just been obliged to pay $5.25 for a pair of shoes that he "used to" buy for $2.50. Further conversation developed the fact that the mechanic's present pay is $9.50 per day and that the best wages he ever "used to" get was $4.00 per day.

In his article on "The New Price Revolution," Irving Fisher, Professor of Political Economy, Yale University, says: "When we investigate almost any one of the so-called high prices for industrial products we are likely to find that individually it is not high; that is, not high relatively to the rest. * * * We are on a new high price level, which will be found a stubborn reality."

Let us stop thinking of things as they were five years ago. Commercial, financial and social conditions have changed more in the last five years than in the previous fifty years. The old conditions are never coming back.

National Prosperity Campaign
Commodore Hotel, New York.

*Let's Go!*

*Space contributed by* NATIONAL BRAKE CO., BUFFALO, N. Y.

# Bankers and Engineers

**Ford, Bacon & Davis,**
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

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**STONE & WEBSTER**
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

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**THE J. G. WHITE COMPANIES**
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK
LONDON CHICAGO

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**SANDERSON & PORTER**
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

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**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

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**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

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**REPUBLIC ENGINEERS, INC.**
CONSULTING AND CONSTRUCTING ENGINEERS
*Valuations Reports Investigations*
*Designs Construction Management*
60 BROADWAY, NEW YORK
CLEVELAND, OHIO
Illuminating Bldg.
YOUNGSTOWN, OHIO
Mahoning Bank Bldg.

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**Scofield Engineering Co.** Consulting Engineers PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

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**ELECTRICAL TESTING LABORATORIES**
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

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**THE COAL & IRON NATIONAL BANK of the City of New York**
Capital $1,500,000
Surplus $1,000,000 Und. Profits $363,051
Resources $23,743,000
Offers to dealers every facility of a New York Clearing House Bank.

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**JOHN A. BEELER**
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

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**WOODMANSEE & DAVIDSON ENGINEERING CO.**
ENGINEERS
MILWAUKEE
First National Bank Bldg.
CHICAGO
784 Continental & Commercial National Bank Bldg.

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**A. L. DRUM & COMPANY**
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

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**ENGELHARDT W. HOLST**
*Engineer*
*Reports, Appraisals, Reorganizations*
683 Atlantic Ave., Boston, Mass.

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**GARDNER F. WELLS**
CONSULTING ENGINEER
PUBLIC UTILITIES
FINANCE OPERATION
SUPERVISION OF CONSTRUCTION
43 Cedar Street, New York

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**THE P. EDW. WISH SERVICE, Inc.**
*Suite* 1710 DETECTIVES *Suite* 715
Park Row Bldg., New York Board of Trade Bldg., Boston

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Frederick Sargent
Wm. S. Monroe
A. D. Lundy
James Lyman
**SARGENT & LUNDY, *Engineers***
1412 Edison Bldg., 72 W. Adams St., Chicago, Ill.

AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes particularly* BRIDGES AND BUILDINGS

*Sales Offices*

*NEW YORK, N. Y. . . . 30 Church Street*
*Philadelphia, Pa. . . . . Widener Building*
*Boston, Mass. . . . John Hancock Building*
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*Buffalo, N. Y. . . . . Marine National Bank*
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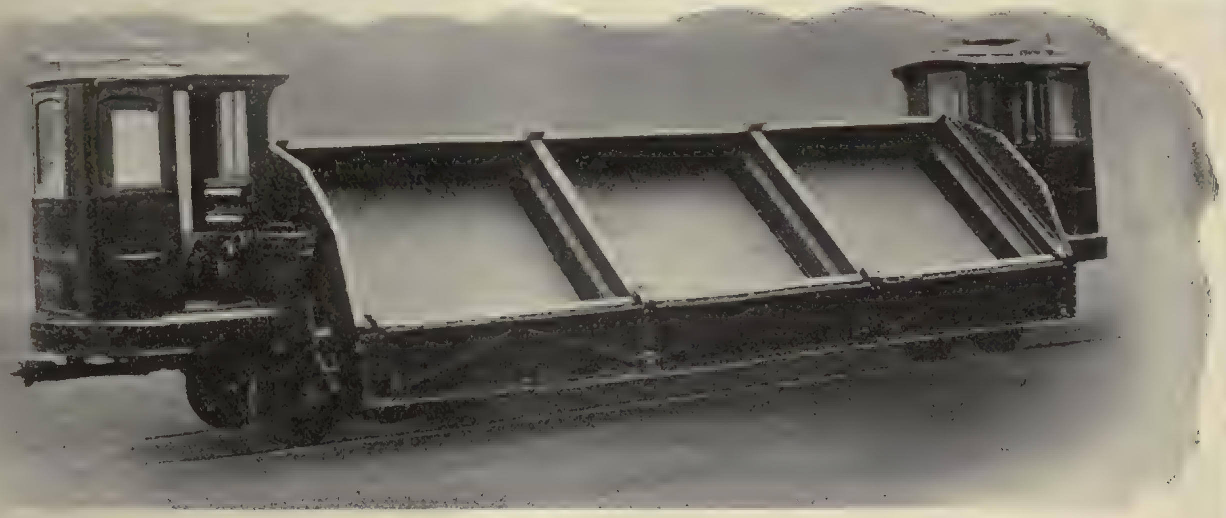
*Atlanta, Ga. . . . . . Candler Building*
*Cleveland, Ohio . . . . Guardian Building*
*Detroit, Mich. . Beecher Ave. & M. C. R. R.*
*CHICAGO, ILL. . 208 South La Salle Street*

*St. Louis, Mo. . Third National Bank Building*
*Denver, Colo. . First National Bank Building*
*Salt Lake City, Utah . . Walker Bank Building*
*Duluth, Minn. . . . . . Wolvin Building*
*Minneapolis, Minn. . . 7th Ave. & 2nd St., S. E.*

*Pacific Coast Representative:*
*U. S. Steel Products Co., Pacific Coast Dept.*
*San Francisco, Cal. . . . . Rialto Building*
*Portland, Ore. . . . . . Selling Building*
*Seattle, Wash. . 4th Ave. So., Cor. Conn. St.*

*Export Representative: United States Steel Products Co., 30 Church St., N. Y.*



**DIFFERENTIAL ELECTRIC DUMPING CARS**

will not only save money in track construction and reconstruction but will also enable you to carry on a profitable freight business

**DIFFERENTIAL CAR CO., Inc., 141 Broadway, New York**

Modern community life and transportation are inseparable.

In spite of Henry Ford's jitneys, electric railways still provide the most efficient city and interurban transportation available.

The electric railway industry will continue until the wells of invention run dry.

At present no such danger has appeared on the horizon.

Cars of half the weight of ten years ago, ball bearings, better motors, better power plants—these and other factors have made it possible to carry passengers more efficiently than ever before.

Modern equipment does even more. It creates more customers.

There is no danger of stagnation in the electric railway industry. Pessimism is a sign of foggy thinking.

Rehabilitation, replacement and expansion are coming closer every day.

The future of the industry is bright and the straight-thinking manufacturer of electric railway equipment is insuring the future of his business because he knows that his business future is worth conserving.

That is why he keeps his business and advertises so that his business will keep him.

The Electric Railway Journal covers all departments of the industry,—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.

Electric Railway Journa
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.
Tenth Ave. at 36th St., New York

CONSTRUCTION SERVICE
*PLUS*
CONSTRUCTIVE ADVICE

It is a familiar circumstance that new plants and extensions to old ones, and in fact, engineering enterprises of all kinds, are frequently found to be either inadequate to requirements or beyond them, usually because the mistake is made of going ahead without first securing the specialized advice of an organization competent to study and understand the peculiar aspects of the problem in hand, and to recommend the most adequate, practical, and therefore the most economical solution. The Thompson-Starrett Company combines constructive advice with construction service, and charges only one fee for both!

*Our Advice is as Good as Our Service*

**THOMPSON-STARRETT COMPANY**
**INDUSTRIAL CONSTRUCTION**
CHICAGO NEW YORK PITTSBURGH

PLANT OF THE CORN PRODUCTS MANUFACTURING COMPANY ARGO, ILL.

# Columbia-Made Forgings

**are Safest**

Columbia-made Drawbar Links

If you could compare your metal-working facilities with ours, you would see one reason why so many railways—large and small—are our permanent customers.

Brake rigging forgings in particular must, above all, possess the quality of SAFETY.

That quality is assured by means of specialized Columbia Equipment operated by Columbia specialists.

We have the facilities not only to give you quality, but just prices and prompt delivery, too.

## Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Corp., Ltd., Toronto, Ont.

**TOOLS**

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

**CAR EQUIPMENT**

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

THE constantly increasing demand for Holdtite Friction Tape and Relio Splicing Compound—two well known brands from our complete line—is proof that they are giving satisfactory taping service.

We attribute their success to conscientious manufacturing methods and the use of consistently good raw materials.

United States Tapes may cost more, but their durability makes them the most economical in actual service.

**United States Rubber Company**

**"A Tape for Every Trade and Purpose"**

# Never Once Did They Whimper

Surgeons say that through indescribable suffering the lips of maimed and mangled heroes were as sublimely silent as the cathedrals in which those broken bodies lay.

Let no man, with eyes to see and a firm, strong body to fight less cruel battles, whimper in his final reckoning with the Victory Liberty Loan when it isn't even giving, but lending!

Buy, as they gave, to the full limit of your cash and resources.

*Space Contributed by*
*ELECTRIC RAILWAY JOURNAL*

# Lincoln Dynamotor

## Portable Bonder and Welder

The Lincoln Dynamotor is Instantly convertible for Track Welding & Bonding.

### There's Money in Your Scrap Pile

THERE are hundreds of dollars in your scrap pile. Every worn-out brake shoe, every broken motor housing and bearing cap, every scored axle and "flatted" wheel represents money which is lost to your company.

Ninety per cent. of that scrap could be perfectly repaired with a Lincoln Dynamotor (Portable Welder and Bonder)—the worn parts can be built up with new metal—the broken parts united again as strongly as ever.

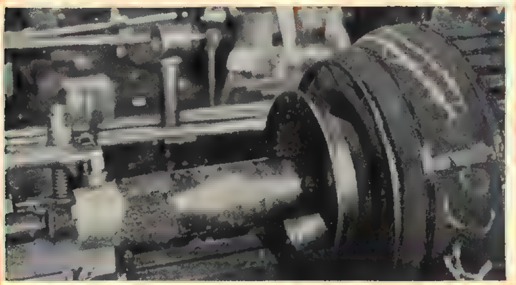
Show your company how to recover those scrap pile dollars with a Lincoln Dynamotor.

**THE LINCOLN BONDING CO.**
CLEVELAND, O.

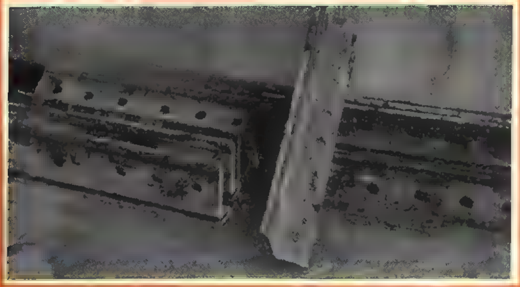
# Worn Equipment Reclaimed with the Lincoln Dynamotor

Worn car parts and shop equipment can often be reclaimed for useful service by a little work with a Lincoln Dynamotor.

**This job saved $60.00.** The bolt holes in this truck side frame had worn too large for further use. They were filled up with new metal by the Lincoln Dynamotor and re-drilled to correct size, thus saving the cost of a new frame.

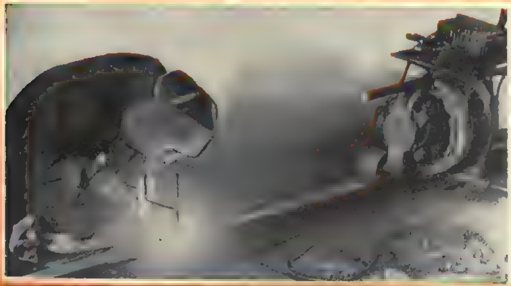


**This job saved $55.00.** Instead of having to dismantle this motor armature in order to replace the worn shaft, the defective parts were built up with a Lincoln Dynamotor and machined true.



**This job saved $10.00.** Even these worn angle plates are worth reclaiming. The Lincoln Dynamotor saved $10.00 by building up the worn edges.

Can you afford to be without a Lincoln Dynamotor? Think it over—then write us for a demonstration.

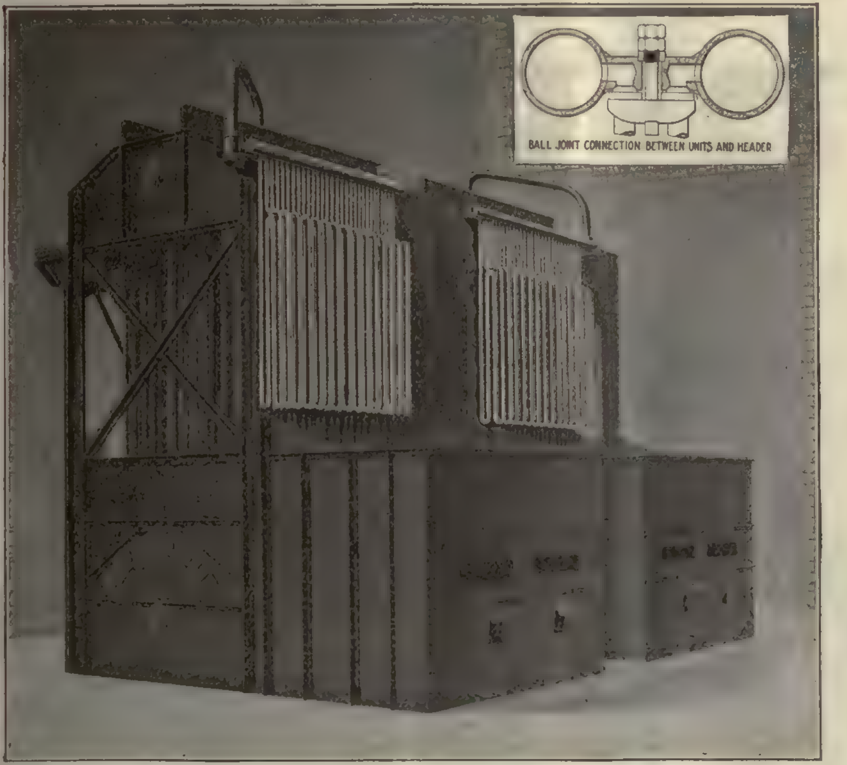


Rail Bonding with the Lincoln Dynamotor, using Lincoln welded bonds, is even easier than shop repairs. Yet these bonds last as long as the rails themselves because they are fused into one solid piece with the rail.

## The Lincoln Bonding Co., 636 Huron Road Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City.
CHARLES N. WOOD COMPANY, 14 Federal Street, Boston, Mass.
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia, Pa.
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building, Pittsburgh, Penn.

CHATTANOOGA ARMATURE WORKS, - - Chattanooga, Tenn.
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.
BURTON R. STARE COMPANY, - - Yesler Way, Seattle, Wash.
A. A. WIGMORE, 441 Pacific Elec. Bldg., - - Los Angeles, Calif.
LINCOLN BONDING CO., - - - Fisher Building, Chicago, Ill.



# Steps In Applying Superheated Steam Which Lead to Higher Economy

**Elesco Superheaters are created for the individual needs of boilers.**

Certain logical steps must be taken to increase your plant economy advantageously through the adoption of superheated steam.

A careful analysis of all the conditions existing in your plant must be made in order to determine what a correct and practical superheater will be expected to do. Through the service which our engineering staff offers, you are assured of our assistance in analyzing your plant conditions.

A superheater must be created as a means to supply superheat correctly under the conditions brought out through the analysis.

The Elesco Superheater is correct in principle and is inherently flexible in application. It is the means to increase the economy of your plant under every condition existing in it.

Bulletin BT-1 describes the Elesco Superheater. Write for it.

*Designing engineers and manufacturers of steam superheaters for all purposes.*

## LOCOMOTIVE SUPERHEATER CO.

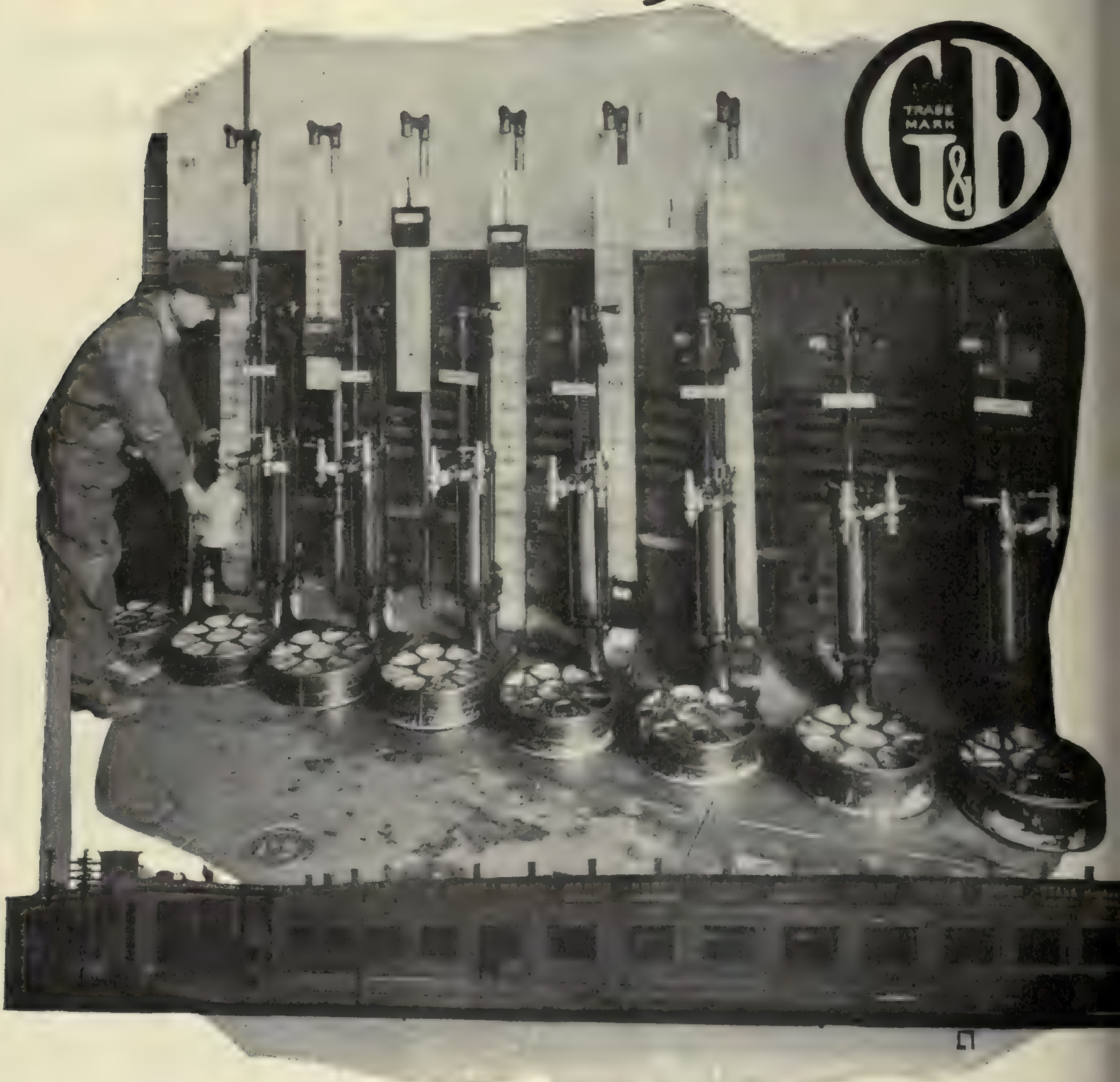
***General Offices,* 30 Church St., New York**

**Chicago**
**Peoples Gas Building**

**Pittsburgh**
**Oliver Building**

**Montreal**
**Transportation Building**

# Twenty Per



GILBERT & BARKE

ESTABLISHE

SPRINGFIEL

# Cent Saved

## This Road Saves This Substantial Percentage In Oil, Labor and Time

***with the***

## GILBERT & BARKER Oil Handling System

There was no magic about it. The old method of handling oils in barrels was obviously wasteful and inefficient. They decided to do away with these methods and, following the lead of many progressive concerns, installed the Gilbert & Barker System of Tanks and Pumps.

The 20% saving was the immediate result. Waste was stopped. Clean oil was assured. All the former exasperating annoyances and losses done away with.

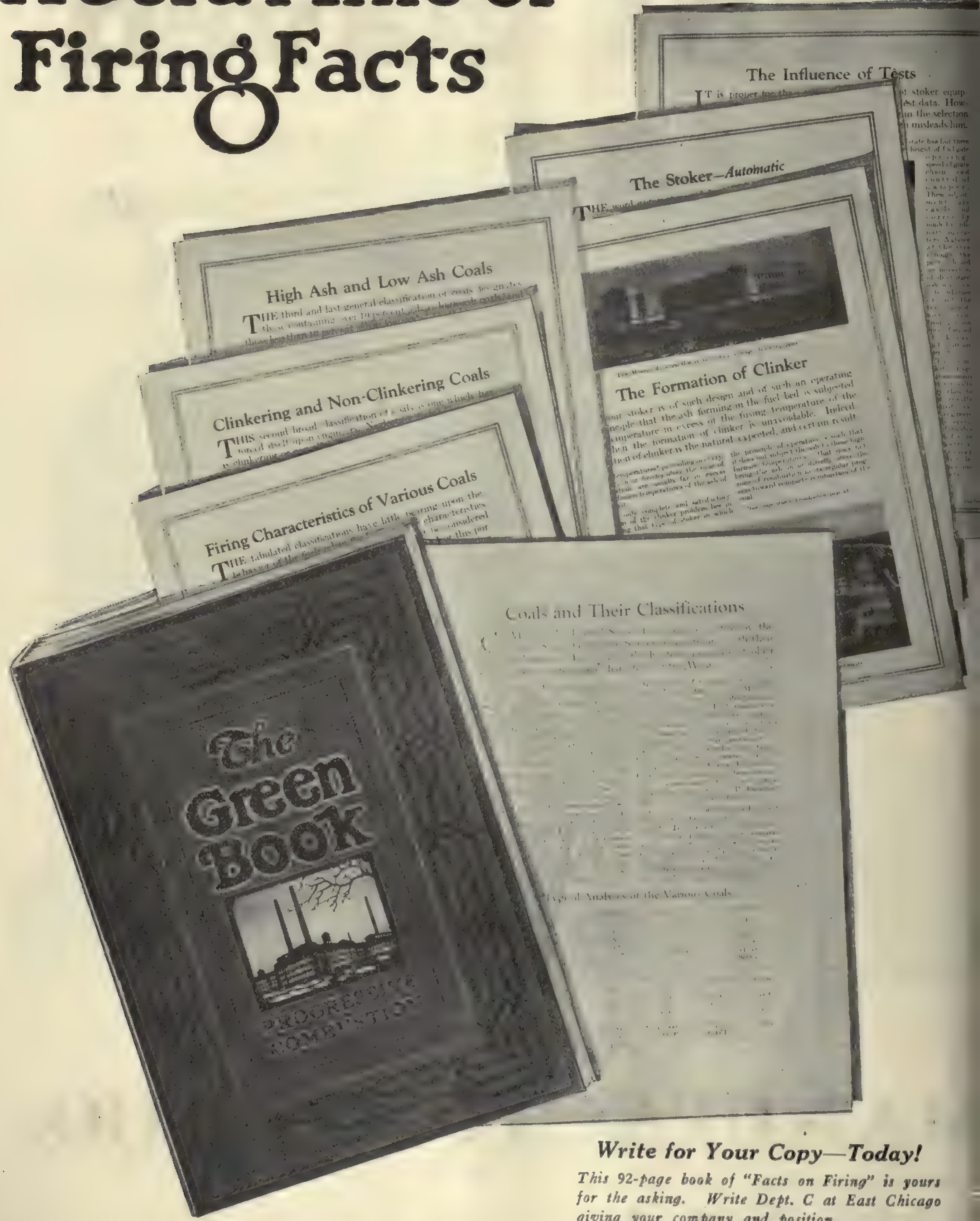
The photograph shows the outfit they installed. The tanks range in capacity from 120 to 15,000 gallons—the two largest outside and the smaller tanks in the basement, directly under the pumps.

The pumps are set to discharge one gallon per turn, but may be set for various desired amounts. Waste in time and oil is eliminated; the fire hazard reduced; floors kept clean; and an accurate check in and out of all oils is permitted.

Send for Bulletin 60, TO-DAY.

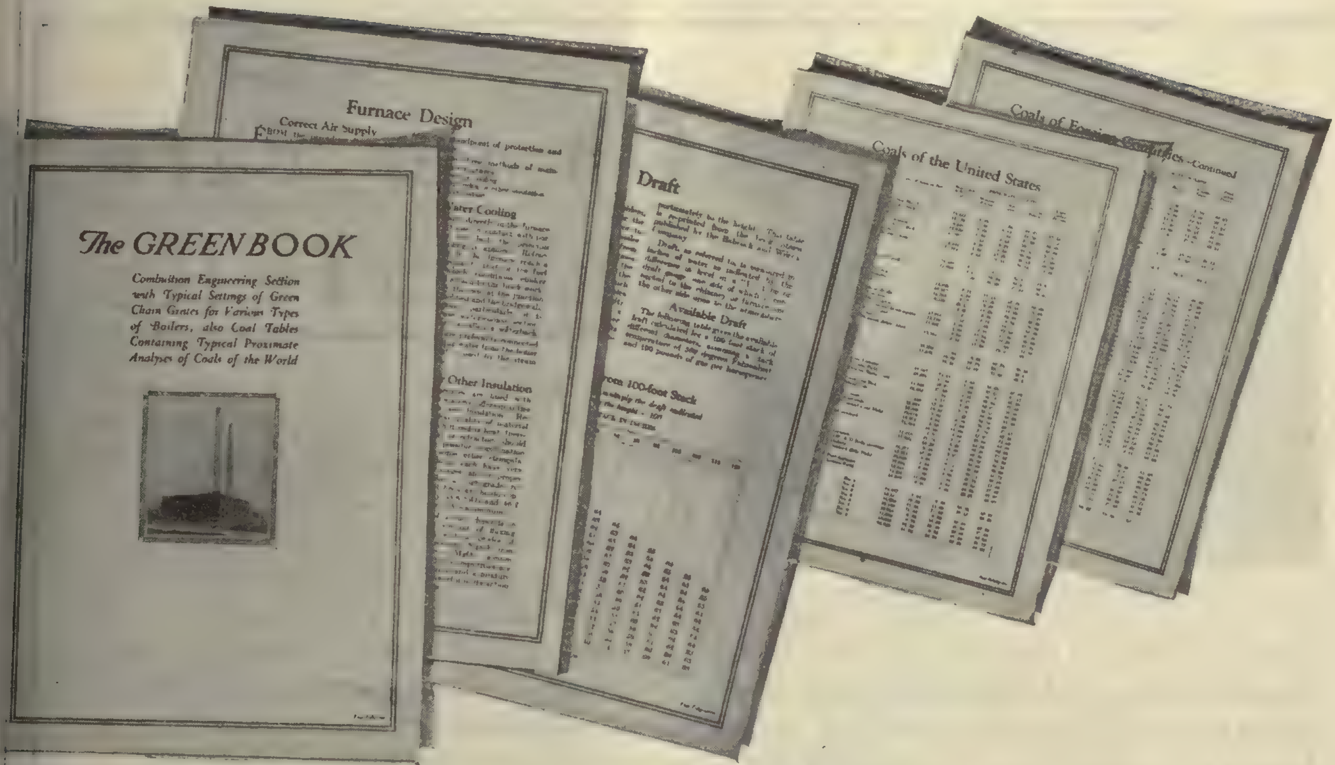
MANUFACTURING CO.
865
MASS., U. S. A.

# A Gold Mine of Firing Facts


The Influence of Tests
The Stoker—Automatic
The Formation of Clinker
High Ash and Low Ash Coals
Clinkering and Non-Clinkering Coals
Firing Characteristics of Various Coals
Coals and Their Classifications
The Green Book
Progressive Combustion

**Write for Your Copy—Today!**

*This 92-page book of "Facts on Firing" is yours for the asking. Write Dept. C at East Chicago giving your company and position.*



*The* GREEN BOOK

*Combustion Engineering Section with Typical Settings of Green Chain Grates for Various Types of Boilers, also Coal Tables Containing Typical Proximate Analyses of Coals of the World*

Furnace Design

Draft

Available Draft

Coals of the United States

Coals of Foreign Countries—Continued

# To Help You Solve Your Firing Problem

What is the difference between Coking and Non-Coking Coals?

Why must a stoker agitate the fuel bed of a Coking coal? How long should this agitation be continued?

How and why are Clinkers formed in a fuel bed?

What is fusible ash coal?

Why do high-ash coals and low fusing ash coals produce extreme clinkers on some types of stokers and not with others? What relation do clinkers have on the amount of labor required to operate stokers?

Can high ash coals be successfully handled on a stoker which does not continuously and automatically discharge refuse and ash?

Should the fuel bed of high ash coals be agitated?

Are all stokers completely automatic? How does this effect the labor cost?

What does Progressive Combustion mean?

What is the value of test results in determining types of stokers?

Are tests conducted using eastern coals of value to the user of western coals?

What is the function of a Pressure Waterback in a furnace?

How do the coals of Illinois differ from those of Iowa in their firing characteristics?

Are the coals of Texas suitable for power plant use?

Are the Japanese and Chinese coals suitable for stoker firing?

What coals are mined in the various countries of South America?

All of the above questions and hundreds of others are answered in the new Green Book of Progressive Combustion. It's a Gold Mine of Firing Facts for the power plant owner, director and engineer. Its 32 pages of engineering data including ten typical chain grate settings, and 15 pages of typical analysis of coals of the world will be of particular value to the designing and consulting engineer.

A request to Dept. C upon your business letterhead giving your position will secure a copy for you—without obligation. Write today for this valuable addition to your technical library.

## Green Engineering Company

*Main Office and Shops:* East Chicago, Indiana

***Backed by 21 Years of Specialized Experience***

**GREEN sealflex Arches**
**GREEN Pressure Water Backs**
**GREEN Steam Jet Ash Conveyor**
**GREEN Materials Transfer and Storage Hopper**

# GREEN CHAIN GRATES

A No. 39 Type Ohmer Fare Register

# Ohmer Fare REGISTERS

OHMER Fare Registers are made in many different types to meet the many different requirements of the electric railways. Every Ohmer Fare Register, however, whether it is one of the small city type machines with a capacity of but three or four fares, or one of the large interurban types registering over a hundred fare denominations, *is built on the same principle. Each fare is clearly indicated as it is registered. A permanent untamperable record of each fare is printed, together with all other necessary data.*

We illustrate a No. 39 City Type Ohmer Fare Register together with its printed record. We also show a No. 52 Interurban Type, adapted to ordinary interurban service.

| Time | Direction | Line No. | Transfers | Tickets | Passes | 5¢ Fares | Total Cash | Register Number | Total Passengers | Date | Identification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 23P | I. | 18 | 000 | 000 | 000 | 000 | $00.00 | 3 | 7470 | DEC 5 | INS8 |
| 4 23P | I. | 18 | 042 | 047 | 056 | 198 | $09.90 | 3 | 7470 | DEC 5 | 27 |
| 3 34P | 0. | 18 | 035 | 032 | 036 | 163 | $08.15 | 3 | 7393 | DEC 5 | 27 |
| 2 25P | I. | 18 | 024 | 017 | 021 | 106 | $0530 | 3 | 7295 | DEC 5 | 27 |
| 1 36P | 0. | 18 | 007 | 009 | 008 | 050 | $0250 | 3 | 7201 | DEC 5 | 27 |
| 12 27P | I. | 39 | 000 | 000 | 000 | 000 | $00.00 | 3 | 7127 | DEC 5 | 27 |
| 12 27P | I. | 39 | 072 | 074 | 068 | 247 | $1235 | 3 | 7127 | DEC 5 | 14 |
| 11 27A | 0. | 39 | 059 | 055 | 043 | 189 | $0945 | 3 | 7012 | DEC 5 | 14 |
| 10 38A | I. | 39 | 034 | 034 | 016 | 138 | $0690 | 3 | 6888 | DEC 5 | 14 |
| 9 29A | 0. | 39 | 016 | 015 | 003 | 063 | $03.15 | 3 | 6763 | DEC 5 | 14 |
| 8 30A | I. | 39 | 000 | 000 | 000 | 000 | $00.00 | 3 | 6666 | DEC 5 | 14 |

Report from a No. 39 Type Ohmer Fare Register

Let us explain some of our other types to you. Our experience has shown that we can meet every requirement with some one of the many types of Ohmer Fare Registers. We will be glad to advise with you about your fare collecting problems. The services of our experts are at your command without obligation to you.

A No. 52 Type Ohmer Interurban Type Register

**Ohmer Fare Register Company**

Dayton, Ohio, U. S. A.

# Standees Appreciate the Easy Grip On Hale & Kilburn Seats

On cars that are crowded, accidents and ill feeling between passengers are often caused by sharp curves and switches. Passengers standing up are taken unawares and cannot reach to take hold of the strap quickly enough. The result is crowding, pushing, falling.

The
Hale & Kilburn
No. 400
Will Interest
You

Hale & Kilburn seats, aside from being the most comfortable to sitting passengers, are an evidence of thought for standees too. The Corner Grip handle can be easily taken hold of without any twisting of hands or fingers. The passenger has a *comfortable,* firm grip.

The sturdy construction of Hale & Kilburn seats enables them to retain their comfortable form. The seat often outlives the car. That's why Hale & Kilburn seats are so widely used in the United States and Europe. A seat for every car—a seat for every service.

**Hale & Kilburn Corp.**

Philadelphia
Washington
Detroit

New York
Atlanta
Chicago

San Francisco
Louisville
St. Louis

**Look through the record of good service in car materials**

The record made by the *actual service* of the materials at work—and you will find ample evidence that **PANTASOTE** Curtains and **AGASOTE** Roofing—Headlining—Wainscoting have proven to be big factors in developing "better service at lower cost."

THE PANTASOTE COMPANY

11 Broadway, New York People's Gas Bldg., Chicago, Ill. 751 Monadnock Bldg., San Francisco, Calif.

# THE WAR IS OVER

## Our Increased Facilities and Our Entire Efforts Can Now Be Devoted To

# YOUR NEEDS—

**Type C17 Coin and Metal Ticket Fare Box**

**C-15 Coin Register**

Shortly after the United States entered the war, the International Register Company, believing its first duty was to support the government in every way in its power and thus help win the war, sought opportunity for so doing.

As a result thereof, it was entrusted by the Navy and War Departments with commissions for developing and manufacturing special instruments of various kinds of vital need as equipment for airplanes used by both Army and Navy. Our equipment was nearly doubled by the purchase and installation of new machines of various kinds of the latest and best designs. A double shift was put on, and in the case of one department, three shifts, and every effort made to furnish the instruments needed promptly and in quantities. Accomplishment of this end for the government was the result of our efforts. Our output was multiplied many times and of it all more than 92 per cent was furnished to the government direct.

During this time we used our best efforts under the emergency to care for the needs of our street railway friends with the men and machines available, and we greatly appreciate the patience and consideration given us. About one-half of our output that was not for the government direct was used to furnish equipment on government priority orders for car lines reaching shipyards, camps or factories engaged in war work.

The cancellation by the government of most of our unfilled contracts has released a large part of our productive capacity for use in clearing up the large accumulation of orders for Coin Registers, Fare Boxes, Standard Registers and Fittings, and has placed us in position, with our greatly increased facilities, to make very prompt deliveries of our regular products.

**Type R-10 Single Register**

***The changes in fare rates now being made are creating many new problems for electric railway companies. Can we not, with our extended experience and splendid facilities, help you in the solution of your fare collection and registration problems?***

# THE INTERNATIONAL REGISTER CO.

**Manufacturers of Coin Registers, Fare Boxes, Fare Registers, Street Railway Fittings.**

**Exclusive Agents for Heeren Enamel Badges**

**15 S. Throop Street, Chicago, Ill.**

Tampa

Calgary, Alberta

Washington

Dallas

Worcester

# BOYERIZED

No matter where you go you will find BOYERIZED Brake Pins and Bushings used by important railways.

From the nation's Capital all the way to Calgary, public utility companies know that it pays to standardize with BOYERIZED Products.

In the big job of rehabilitating your physical equipment, it will pay *you* to BOYERIZE.

Shall we send a trial order?

***Remember:***

*When you buy BOYERIZED Products, you get case-hardening that's uniform—a quality seldom realized in the ordinary blacksmith shop.*

ELECTRIC RAILWAY SUPPLIES

**Bemis Car Truck Company**

SPRINGFIELD MASS

**Bemis Trucks**
**Case Hardened Brake Pins**
**Case Hardened Bushings**
**Case Hardened Nuts and Bolts**
**Manganese Brake Heads**
**Manganese Transom Plates**
**Manganese Body Bushings**
**Bronze Axle Bearings**

# Study the Comparative Results of Open Hearth and Electric Steel Armature Shafts for Electric Railway Service

Here they are:

(Columns showing results obtained in test)

| Properties | Open Hearth Steel | Electric Steel General Steel Co. |
|---|---|---|
| Ult. Strength, lbs. per sq.in...... | 91,200 | 107,700 |
| Elastic Limit, lbs. per sq.in...... | 46,000 | 69,950 |
| Elongation in 2 in.............. | 22.2% | 23.5% |
| Reduction of Area............. | 44.8% | 50.0% |
| Fracture | Silky, small cup. | Silky, full cup. |
| Elastic—Torsion, lbs. sq.in...... | 16,750 | 33,700 |
| Shearing Strength, lbs. sq.in..... | 62,400 | 76 |

The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a "Pittsburgh" electric furnace. Both were the normal product. Heat treated in each case.

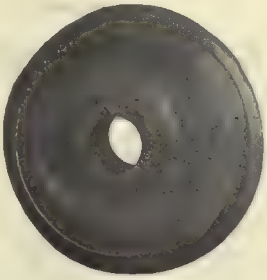
We are equipped to handle the forging of axles and armature shafts from our own manufactured electric furnace steel.

IF YE BREAK FAITH WITH THEM WHO DIE
THEY WILL NOT SLEEP
THO POPPIES GROW IN FLANDERS FIELDS

*We Solicit Your Inquiries*

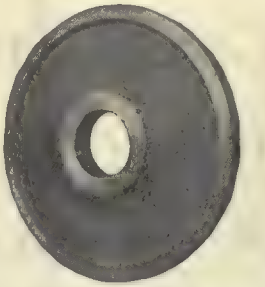
## GENERAL STEEL CO.

Public Service Building, MILWAUKEE, Wis.

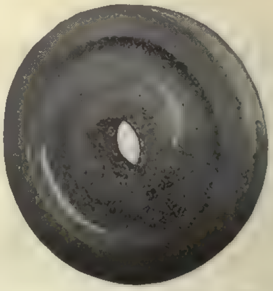


Industrial Wheel

Gear Blank



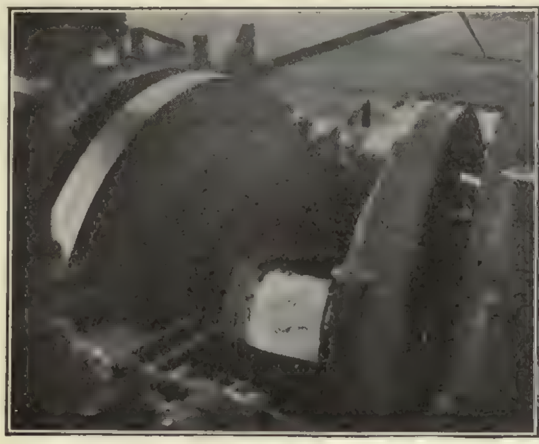
Turbine Bucket Wheel



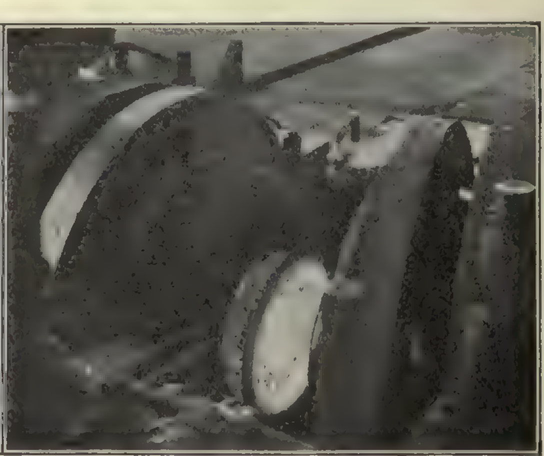
Double Flange Crane Wheel

# CAMBRIA

## CIRCULAR FORGED AND ROLLED SECTIONS



Wheel Mill With Block in Position



Blank in Position After Forging and Rolling

FROM the reheating furnace the blocks go to this machine which forms the circular or annular sections by a combined rolling and hydraulic forging action, working the steel thoroughly and putting it into the best possible shape for severe service. Two dies are set at an angle to each other. One is mounted on a shaft driven by an electric motor which can develop from 1000 to 2000 horsepower. The other is mounted on a hydraulic plunger and at the same time is free to rotate by friction transmitted from the other die through the block. As the dies rotate the plunger moves forward with a thrust of 3,000,000 pounds or more, the blank being squeezed and rolled into shape between them.

**MIDVALE STEEL AND ORDNANCE COMPANY**
**CAMBRIA STEEL COMPANY**

*General Sales Office,* Widener Building, Philadelphia, Pa.

*District Sales Offices:* Atlanta, Boston, Chicago, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Salt Lake City, Seattle, St. Louis,

CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York, is the sole exporter of our commercial products. Address all export inquiries to them.

*"We Want You to Become Better Acquainted With Us" Series. Number 6-1.*

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

*"The 'Standard' Brand on your material is an assurance of eventual economy."*

## STANDARD STEEL WORKS CO.

GENERAL OFFICES:

MORRIS BUILDING, PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA

RICHMOND
SAN FRANCISCO
NEW YORK
MONTEREY, MEX.

MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

## The Chilled Iron Wheel Has Performed Its Every Function at a Minimum Cost

### *For Freight Cars*

95 PER CENT. of all cars in this type of service are equipped with Chilled Iron Wheels, provided for by the MASTER CAR BUILDERS' STANDARDS, as follows:

625 lb. Wheel for Cars of 30 tons capacity.
700 lb. Wheel for Cars of 40 tons capacity.
725 lb. Wheel for Cars of 50 tons capacity.
800 lb. Wheel for Cars of 70 tons capacity.

### *For Street Cars*

The Chilled Iron Wheel is Standard for Street Car Service in 95 PER CENT. of all cities in the United States and Canada, operating 100 cars or over.

### *The Reason*

Chilled Iron Wheels possess a graded hardness of structure, which is ideal for service, namely: HARD TREAD, SOFT PLATES AND SOFT HUB; Chilled Iron will not CRUSH OR FLOW under heavy loads.

A demonstration of the BEARING POWER OF CHILLED IRON is found where heavy hoisting cranes are operated, each wheel carrying 105,000 pounds.

Chilled Iron Wheels under cars of 70 tons capacity are only required to carry 25,000 pounds each.

### *The Conclusion*

The uninterrupted use of Chilled Iron Wheels for 69 years under 95 PER CENT. of the nation's equipment proves that no other material can match them for economical and dependable service.

**ASSOCIATION OF MFRS. OF CHILLED CAR WHEELS**
**1229 McCormick Bldg., Chicago** [redacted]

*Representing forty-eight wheel foundries throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per day.*

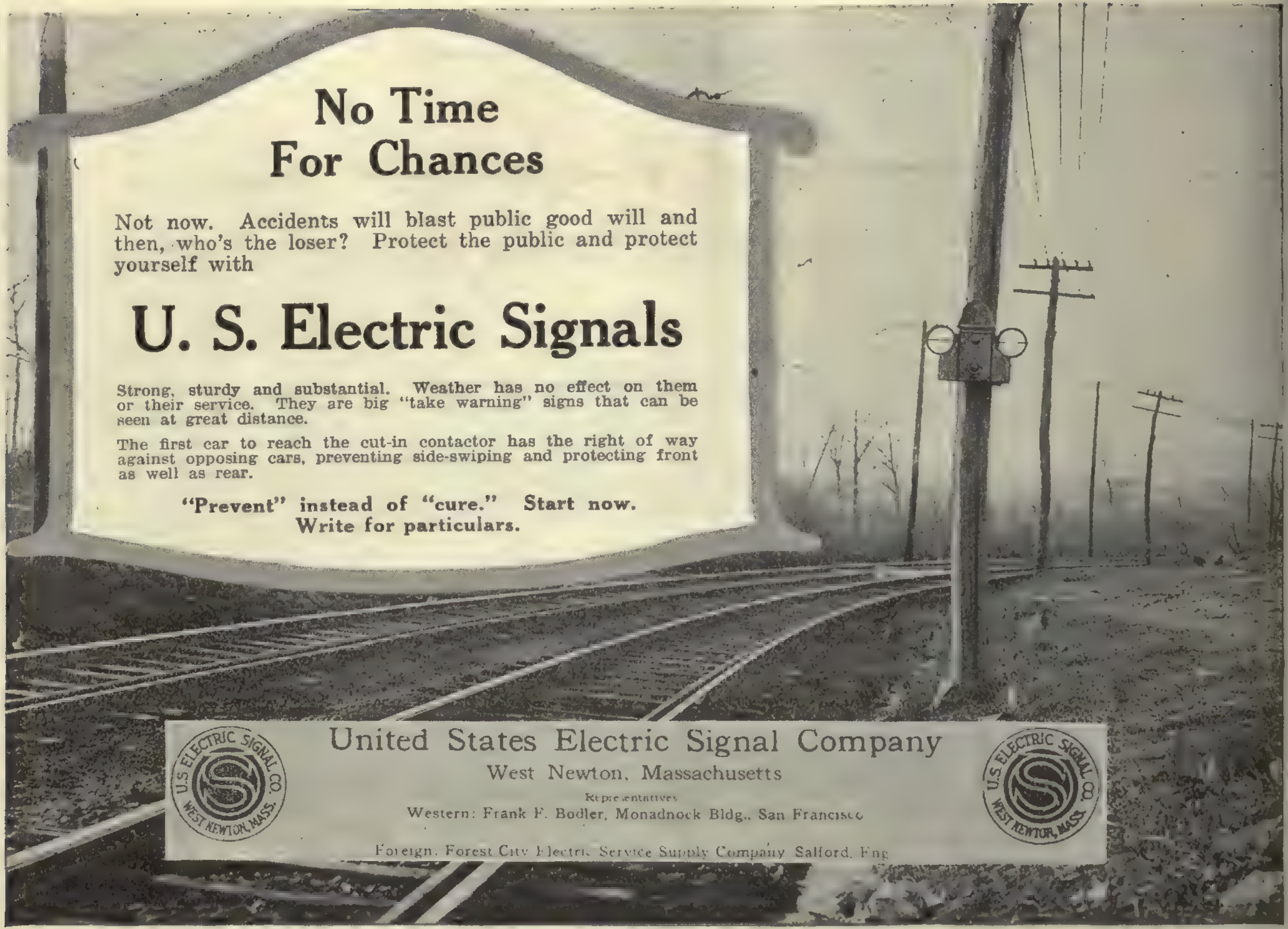
1929—

In ten years—
how much will your
light weight cars
have saved you?
It depends on
how well they're built—

The Birney Light Weight
One Man Safety Car

built in our "Quality Shops"
will stand that test. We've
been building light weight one
man cars since the first—
years ago. So we know.

St. Louis Car Co.,
St. Louis Mo.



## No Time For Chances

Not now. Accidents will blast public good will and then, who's the loser? Protect the public and protect yourself with

## U. S. Electric Signals

Strong, sturdy and substantial. Weather has no effect on them or their service. They are big "take warning" signs that can be seen at great distance.

The first car to reach the cut-in contactor has the right of way against opposing cars, preventing side-swiping and protecting front as well as rear.

**"Prevent" instead of "cure." Start now.**
**Write for particulars.**

United States Electric Signal Company
West Newton, Massachusetts
Representatives
Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign, Forest City Electric Service Supply Company, Salford, Eng

---

# ROEBLING ELECTRICAL

*We make with strict attention to quality of materials and workmanship*

**Transmission Wire**
**Trolley Wire**
**Telephone Wire**
**Steel Contact Wire**
**Wire Strand**
**Insulated Wires and**
**Cables of all kinds**

**John A. Roebling's Sons Co.**
**Trenton, N. J.**

***Branches:***
**New York Boston Chicago Philadelphia Pittsburgh**
**Cleveland Atlanta San Francisco Los Angeles**
**Seattle Portland, Ore.**

# WIRES AND CABLES

OKONITE

TRADE MARK
REG. U. S. PATENT OFFICE.

# The Standard for Rubber Insulation

## Power Cables—Signal Wires—Car Wires
## Motor Leads, etc., etc.

Steel Armored—Lead Covered—Braided

*We Manufacture*

| | |
|---|---|
| Okonite (Rubber) Insulated Wires and Cables | Okonite Tape—(Rubber Insulating) |
| Varnished Cambric Insulated Wires and Cables | Manson Tape—(Rubber Filled Cloth) |

*Samples and Estimates on Application*

**THE OKONITE COMPANY, Passaic, New Jersey**

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Pettingell-Andrews Co., Boston, Mass.

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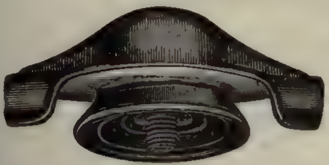


## You Can Minimize Overhead Repair Work

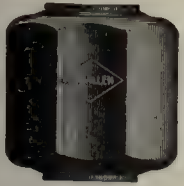
and successfully cut maintenance costs if you turn to

# The Macallen Line

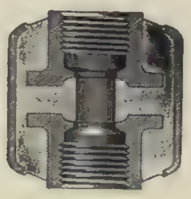
of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.



## The Macallen Insulating Joint



Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

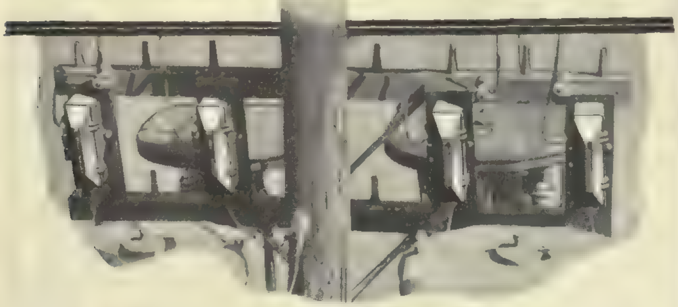
May We Send Our Catalog?

TRADE MACALLEN MARK

**The Macallen Company**
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK

# NOARK
## PRIMARY FUSE MATERIAL



## Ask a lineman if high-tension work is dangerous

and he will tell you that it depends on the precautions taken to protect him and on the type of apparatus used.

The fuse holder of a "Noark" Primary Box has a porcelain handle which projects beyond the edge of the box when the lid is opened, making fuse renewal safe and easy. "Noark" Primary Boxes safeguard not only your linemen but also safeguards your transformer equipment.

Tested at 400 per cent of their rated voltage—generously proportioned to prevent leakage and mechanical strains—"Noark" Primary Boxes can be depended on even under the most severe usage for satisfactory service in all kinds of weather. Designed for pole, wall or conduit installations in sizes to take ½ to 100 ampere, 2500-volt "Noark" Fuses.

**H. W. JOHNS-MANVILLE CO.**
New York City

*10 Factories—Branches in 63 Large Cities*

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT
And also through—
**Asbestos**
and its allied products
JOHNS-MANVILLE
Serves in
Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

Manufactured by the Johns-Pratt Co., Hartford, Conn.

H. W. Johns-Manville Co., Sole Selling Agents

**JOHNS-MANVILLE**
**ELECTRICAL MATERIALS**

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## Safety with 600 Volts

insured by using

## Krantz Railway Type Safety Panel Boards

W
WESTINGHOUSE ELECTRIC

600-volt circuits are dangerous to life.

Provide absolute safety to employees by using Krantz Railway-Type Safety Panel Boards for controlling the lighting and heating circuits in electric railway stations.

Impossible to touch live parts when operating switches. Each switch is a separate unit that can be removed without danger, and without interfering with other circuits.

Used by some of the largest subways and elevated roads.

Ask for Miniature Catalogue 1B-5.

Westinghouse Elec. & Mfg. Co.
East Pittsburgh, Pa.

Showing ease of removal of individual switch.

# CONCRETE POLES

## HOLLOW—REINFORCED—FLEXIBLE

Exhaustive tests have proved the superiority of Massey Hollow Concrete Poles for the electric railway field. Their ample reinforcement gives strength; their hollow structure gives flexibility; and, in addition, there is no depreciation and no maintenance cost where concrete poles are used. We will be glad to furnish full particulars.

**MASSEY CONCRETE PRODUCTS CORPORATION**
**Peoples Gas Building, Chicago**

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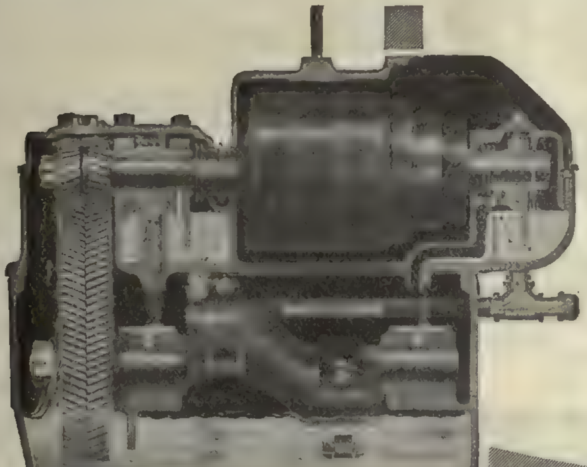
# Compressors for Air Brake Equipment—



**Lubrication—**

The thoroughness with which this important detail has been worked out is an index to the complete design and careful construction of these improved compressors for air brake equipments.

***Let us tell you more about them.***
***Send for Bulletin 1525-A.***

**ALLIS-CHALMERS**

Milwaukee. Wis. U.S.A.

# Victor

## INSULATORS

They meet the rigid requirements of the transmission system from which uninterrupted service is demanded.

Victor Insulators insure uninterrupted service—so vital to increased revenue and lowest operating costs.

**The Locke Insulator Mfg. Company**
**Victor, New York**

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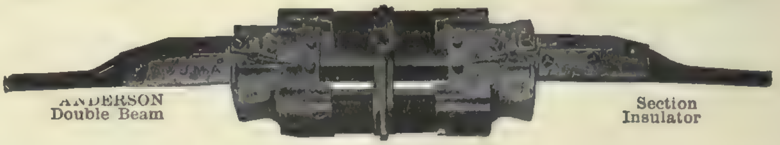
## Overhead Equipment that keeps down Overhead Expenses

ANDERSON Trolley Wheel

## The ANDERSON Line Always Wins on the Basis of Merit First

- Harps
- Bases
- Trolley Wheels
- Strains
- etc.

ANDERSON Cross-Over



ANDERSON Double Beam

Section Insulator

Write for Catalog No. 8

**Albert & J. M. Anderson Mfg. Co.**

289-293 A Street (Established 1877) Boston, Mass., U. S. A.

BRANCHES:

New York, 135 Broadway
Chicago, 105 So. Dearborn Street
Philadelphia, 429 Real Estate Trust Bldg.
London, E. C., 48 Milton Street

# It Takes Hard Work To Pump a Hand Car

But your men will get to the job with that "get up and go" feeling after an exhilarating ride in the cool, crisp air on a section car equipped with

**THE "New-Way" ENGINE**
**GOES AND GOES RIGHT**

More than one electric railway has paid for a number of these motor section cars with the energy of the men that is saved for the work for which they are primarily employed.

We can tell you more about the savings and efficiency of these motor section cars if you will get in touch with us. And it will pay you too. Write.

**THE "New-Way" MOTOR COMPANY**
**LANSING, MICHIGAN, U.S.A.**

---

# An 82-pound pull will lift a ton

Its strength is surprising. The all-steel working parts mean that you can depend on it, too. It has a safety factor of 3½ to 1 in its weakest part—no greater is found in any hand chain hoist.

And just because those working parts are steel instead of the ordinary cast iron, a Tribloc is not only stronger and safer but also wears longer.

The safety is further increased by our patented loop hand chain guide—which prevents the "gagging" of the hand chain at any speed or any angle.

Nothing that could add to the efficiency or safety of a Tribloc has been overlooked. It's so good we guarantee it for five years.

*You'll find details and prices in our catalog, which comes to you on request.*

**Ford Chain Block & Mfg. Company**
**Second and Diamond Sts., Philadelphia, Pa.**

OVER-SEAS REPRESENTATIVE
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
120 BROADWAY, NEW YORK, U.S.A.
Paris Turin Zurich Barcelona

# ECONOMY renewable FUSES

are commended to the practical electrical engineer because in performance they do all that could be asked of any fuses and, in addition, cut annual fuse maintenance costs 80 per cent.

This pioneer renewable fuse, when blown, is instantly restored to its original efficiency by an inexpensive "Drop Out" Renewal Link—the most efficient and economical of all renewable elements. It's the work of a moment for even a novice to replace the link and renew the fuse.

ECONOMY renewable FUSES are used by leading electric railways throughout North America, and are sold by most leading jobbers and dealers.

***Write for Catalog 17***

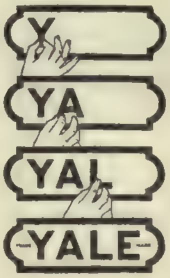
**ECONOMY FUSE & MFG. CO.**
**Kinzie and Orleans Streets**
**Chicago, U. S. A.**

***Sole manufacturers of "ARKLESS"—the Non-Renewable Fuse with the 100% Guaranteed Indicator.***

ECONOMY FUSES ARE ALSO MADE IN CANADA AT MONTREAL

## *Semi-Centennial of* YALE

*Fifty Years of Service*



*"There is no legacy so rich as honesty"*
*—All's Well that Ends Well*

WITH entire sincerity I can say that I believe the guiding principle of those by whom this company has been built up has been Honesty, of purpose and of endeavor. Honesty in design and production, that each article shall be *right* for its purpose. Honesty in representation, that the buyer shall not be misled. Honesty in pricing, that quality shall not be sacrificed to cheapness. Honesty in all relations, with employees, customers and the public. If then the future may be judged by the past, I predict with confidence that the policy of honest effort and honest dealing, maintained during the past fifty years by those who founded and built up this business, will be continued in the years to come by their successors, and will win rewards in the future even greater than in the past.

While it is true that this business has grown because it has prospered, it is equally true that it has prospered because it has grown.

Henry R. Towne
*Chairman of the Board*

*This statement by the Company's Chairman, who has been the guiding force in the organization since it was founded, forms the concluding page in a Semi-Centennial booklet just published that tells the story of the company's growth, from a small shop to world dominance in its field—a true Romance of American business.*

*It will be sent to you free upon request.*

**The Yale & Towne Mfg. Company** 9 East 40th Street, New York City
Chicago Office: 77 East Lake Street Canadian Yale & Towne Limited, St. Catharines, Ontario

IF YE BREAK FAITH WITH THEM WHO DIE
THEY WILL NOT SLEEP
THO POPPIES GROW IN FLANDERS FIELDS

"Prudential"
Steel Buildings
Portable

For
Peace
and
Prosperity

The C. D. Pruden Co.

Baltimore, Md. 56 Pine St., New York, N. Y.

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*Hydraulic Bender Capacity 30 Tons*

HYDRAULIC MACHINERY
FOR THE ELECTRIC RAILWAY SHOP

We show here two hydraulic benders, one for bending and straightening trolley poles, conduit pipe, bars and other light bending; the other for bending I-beams, conductor rails and rails. They are built to withstand the rough handling of unskilled labor.

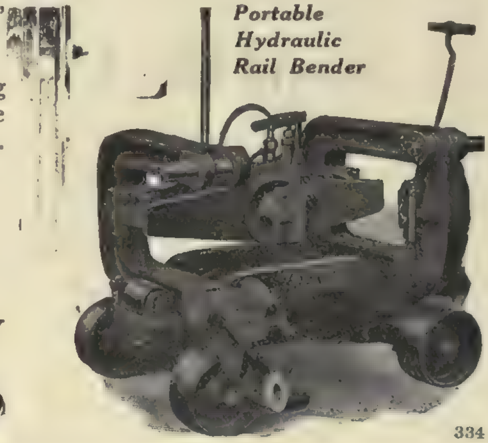
This pipe bender is built in standard sizes of thirty to forty tons' capacity, sufficient to bend one inch to six inch pipe.

This rail bender is an improvement over similar forms, being stronger and equipped with formed bending blocks. It will be seen that the yoke swings back for the rail to be inserted sideways.

**We build many other hydraulic tools for the car shop, such as shears, jacks, pit jacks, journal jacks, car jacks, presses, etc., all as carefully designed as the above to give the user the best service.**

*WRITE FOR CATALOGS*

**THE WATSON-STILLMAN COMPANY**
**46 CHURCH STREET, NEW YORK**
**CHICAGO: McCORMICK BLDG.**


*Portable Hydraulic Rail Bender*

334

Metal
Fare Tokens

Enlarged to 1¾ times actual size

Nickel-Silver
Bronze or Brass

Designs developed according to your ideas and subject to your approval. We make the metal, the dies and the tokens.

We have the experience, the equipment, the capacity for rapid quantity production.

*Information on request.*

**Scovill Mfg. Co.**
*Established* 1802
Waterbury, Conn.

New York Boston
Chicago Detroit

TOOL STEEL
That's what the
DIES are made of in

B-V
Punches

No. 40 Made with flat or elliptical spring.

Dies made of metal that wears readily soon produce indistinct perforations, which offer an opportunity for possible mistakes, misunderstandings and lost revenue. B-V Dies, of Tool Steel, LAST. We make 100 varieties of punches, many adopted as standard by the leading electric railways of the U. S. and foreign countries.

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No. 50 popular on many roads.

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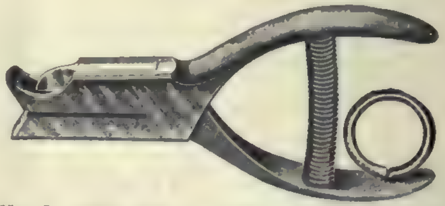

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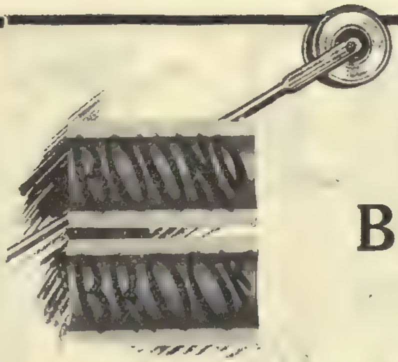

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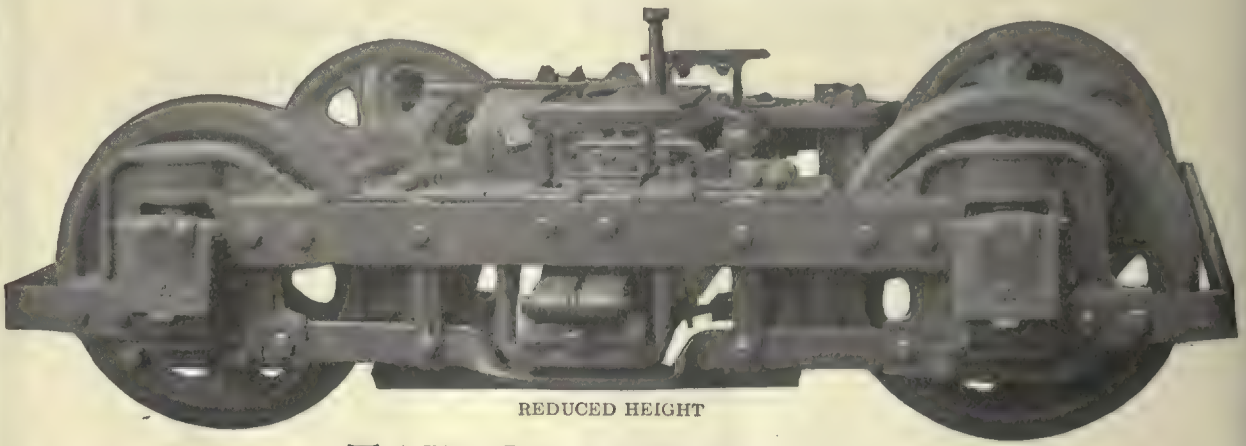

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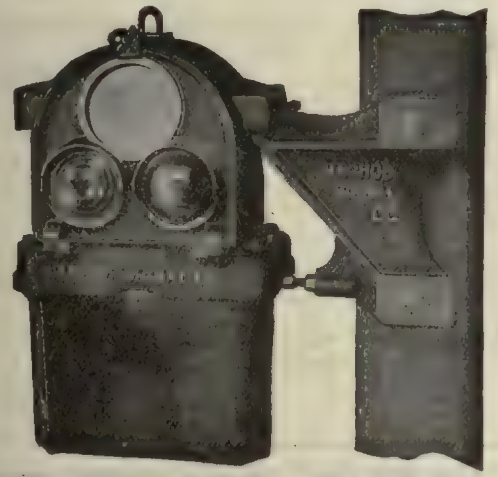

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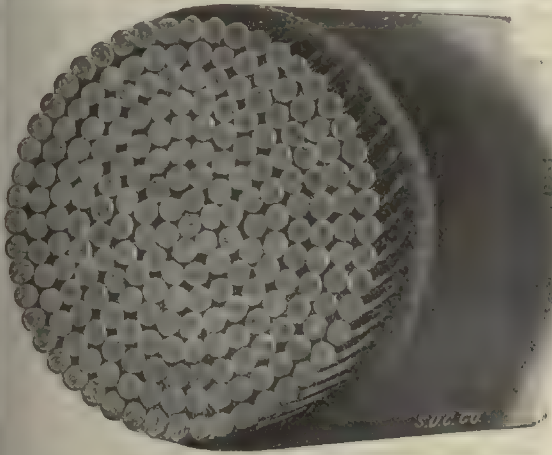

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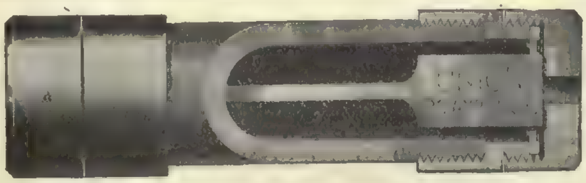

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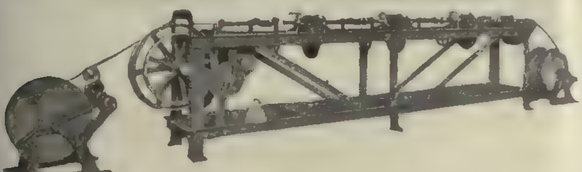

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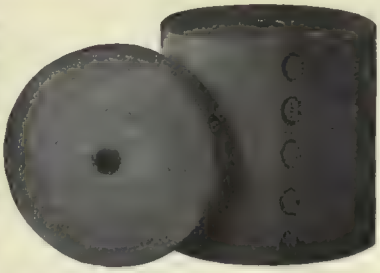

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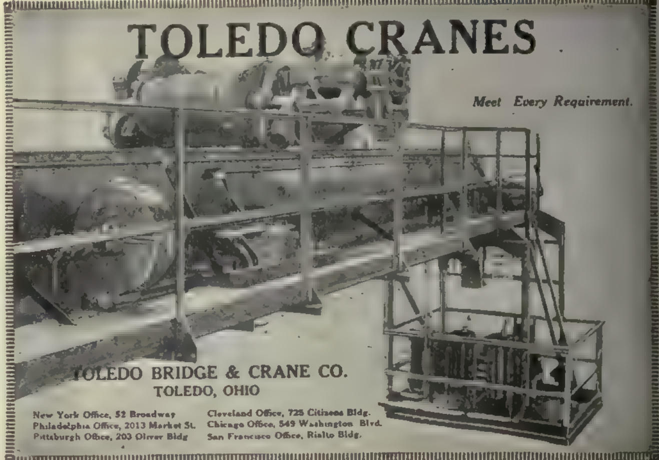

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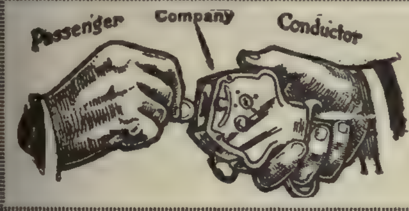

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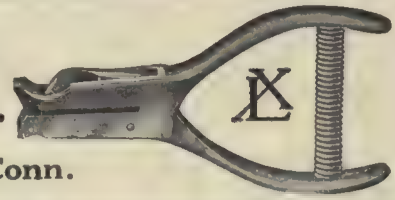

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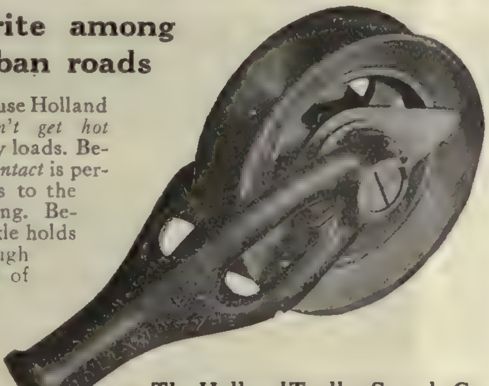

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**EVERY GEAR REGISTERED**

The result of the best practice in electric railway work is recorded every week in the Electric Railway Journal.

**UNIVERSAL ANTI-SLIP TREADS**
cars and station steps.

**Universal Safety Tread Company**
**Waltham, Mass.**

**MASON SAFETY TREAD**—lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.

**KARBOLITH CAR FLOORING**—for steel cars; is sanitary, light weight, fire proof, non-slippery.

**STANWOOD STEPS**—Self-cleaning, non-slippery, light.

Our products used on all leading railroads, on cars and stations. For details address:

**AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.**
Branch Offices: Boston, New York City, Philadelphia.
Agencies in all principal cities.

**"Street Railway Accounting"**

**By IRVILLE A. MAY, C.P.A.**
**Comptroller of The Connecticut Company**

This complete working manual of operating practice is concerned entirely with the features of accounting peculiar to street or electric railways. It is divided into three distinct sections: Organization of the Accounting Department; Accounting Outside the Comptroller's Office, and Accounting Inside the Comptroller's Office.

Forms. In addition to the text there are 212 working forms, all of which have been successfully applied to actual working conditions. Each is comprehensive enough for all the purposes of the comptroller or auditor, and simple enough to be understood by the conductor or any other operative.

It contains hundreds of valuable suggestions which can be profitably embodied in any street or electric railway system, and contains nothing that is not eminently practical. The author is Vice President, American Electric Railway Accountants' Assn.; Comptroller, The Connecticut Company; and Auditor, Berkshire Street Railways Co.

**Examine it FREE**

*"Street Railway Accounting" will be sent free on approval for five days' free inspection. Use coupon in ordering.*

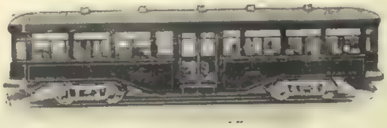
**The Ronald Press Company, Dept. 86**
**20 Vesey Street, New York City.**

Send me a copy of "Street Railway Accounting." After five days I will either return it to you or remit the full price, $5.00.

Name ..........................................

Business firm
or reference ..........................................

Address ..........................................



PERLEY A. THOMAS
CAR WORKS

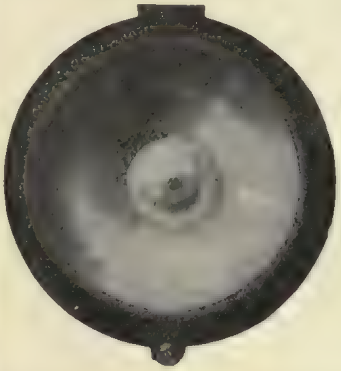
Manufacturer of Cars
and Car Materials

Cars of all types from one-man to large
interurban

HIGH POINT, N. C.

SASHES, DOORS
INTERIOR FINISH
VESTIBULES AND FRAMING

CURTAINS, VENTILATORS
SASH AND DOOR TRIMMINGS
DOOR AND STEP MECHANISM



The McLain No. 25 Headlight

gives powerful road illumination, at the same time eliminating glare. It is an extended dash type light made of Pressed Steel throughout, assuring light weight without any sacrifice in strength or durability. It is absolutely waterproof, weather proof and solid.

Concentrated filament type using either a 23 or 36 watt lamp.

It's the LIGHTEST, BRIGHTEST, TIGHTEST headlight on the market and it doesn't cost any more than the others.

The Trolley Supply Co., Canton, Ohio

Take a new Tip, when both sides of old tip are worn out. Snap it on your Triggerlock finger, which stays on the controller, saving removal and adjustment. Time and money are saved. 100,000 renewal tips and 250,000 fingers sold last year.

Triggerlock Reversible Controller Finger

814-18 Bath Ave.
Niagara Falls, N. Y.

557 King St., West
Toronto, Canada

Holden & White Inc.

Electric Railway Sales Distributors for:

Anderson Brake Slack Adjusters.
Garland Ventilators. Miller Trolley Shoe.
Perry-Hartman Center Plates and Side Bearings.
Jewel Hot Blast Heaters.
Wasson Air-Retrieving Trolley Bases (U. S.).
Reliance Air Sanders. Air Rectifier.

Chicago District Representatives for:

Drew Line Material
Columbia Car & Shop Equipment
Earll Trolley Catchers and Retrievers

817 Fisher Building CHICAGO

*Branch Office—2213 Dime Bank Bldg., Detroit*

Buy—Exchange—Sell

Some other reader may have just what you want—and he may be in the market for the items you wish to turn into cash.

Let the Searchlight help YOU

54

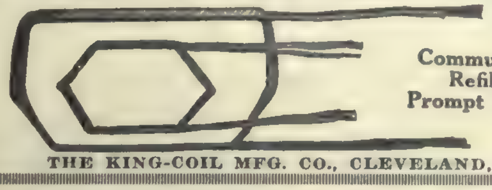
Railroad and Tram Car Specialties

New inventions developed, perfected
and worked for the English market

Messrs. G. D. Peters & Co., Ltd.

Windsor Works, Slough, (Bucks), Eng.

Armature and Field Coils—Armatures Rewound



Commutators
Refilled
Prompt Service

THE KING-COIL MFG. CO., CLEVELAND, OHIO

DREW MOTORMEN'S
SAFETY MIRRORS

*Eliminate Accidents*

*Send for catalogue No. 18*

DREW ELECTRIC & MFG. CO.
1016 E. Michigan St., Indianapolis, Ind.

# SEARCHLIGHT SECTION

## *Get Your Wants into the Searchlight*

### ADVERTISING RATES

#### Ads Set in Uniform Style

*(Solid, in one paragraph, without display.)*

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted
Evening Work Wanted
Vacation Work Wanted
Salesman Wants Connections

**FIVE CENTS A WORD**, minimum charge $1.50 an insertion, for advertisement under:

Agencies Wanted
Agents Wanted
Business Opportunities
Desk Room for Rent
Educational
Employment Agencies
Desk Room Wanted
Foreign Business
Positions Vacant
Partner Wanted
Representations Wanted
Salesmen Wanted
Patents for Sale
Plants for Sale
Sub-Contracts Wanted
Work Wanted
Miscellaneous for Sale, for Rent or Want Ads.

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

#### Ads Set in Display Type

*(Individual space, within border rules.)*

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

| | | | |
|---|---|---|---|
| 1 to 3 in., | $3.00 an in. | 15 to 26 in., | $2.70 an in. |
| 4 to 7 in., | 2.90 an in. | 27 to 49 in., | 2.60 an in. |
| 8 to 14 in., | 2.80 an in. | 50 to 99 in., | 2.50 an in. |

Rates for larger space furnished on request.

*For quick and satisfactory results tell the reader everything that he will want to know.*

### INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave., New York
935 Real Estate Trust Bldg., Philadelphia
657 Leader-News Bldg., Cleveland
1570 Old Colony Bldg., Chicago
519 Newhouse Bldg., Salt Lake City
501 Rialto Bldg., San Francisco

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

### POSITIONS VACANT

COACH painter, in reply state experience, wages and how soon you could report for work. Train Dispatcher, for interurban road, state age, experience, salary wanted and how soon could report for work. P-395, Elec. Ry. Journal, Chicago.

DRAFTSMAN wanted, experienced in calculating and designing street railway special track work. State salary and experience. The Buda Co., Harvey, Ill.

ELECTRICAL and civil engineer wanted, capable of supervising roadway construction and maintenance, trolley construction and lighting distribution system, construction, supervision and operation of central station, capable of making investigation and appraisal of street railway plant. Address with references. Apply to P-390, Elec. Ry. Journal, Chicago.

WANTED

EXPERIENCED

**PUBLIC UTILITY MANAGER**

Sound business judgment. Demonstrated ability in public relations. Salary $10,000. Replies treated as confidential.

P-394 Electric Railway Journal
10th Avenue at 36th St., New York, N. Y.

### POSITIONS VACANT

MASTER mechanic wanted between the ages of 30 and 40 years; must be an electrical and mechanical engineer, a live wire and come well recommended. Address P-391, Elec. Ry. Journal, Chicago.

### POSITIONS WANTED

AUDITOR, comptroller, broad experience in finances and accounting with large utility interests, both railway and lighting; competent executive and organizer. References and business history upon request. PW-392, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

ELECTRICAL, mechanical or executive employment suitable for married man with technical knowledge, mechanical skill, business training and refinement. Broad experience as machinist and factory electrician and as steam engineer, electrical engineer, superintendent and manager of electric light and railway properties. Efficiency or research work preferred but any suitable immediate employment considered. Best of references. Address "Industry," Mauch Chunk, Pa.

POSITION as superintendent or master mechanic of small road; have had 15 years' experience wiring, overhauling and general inspection on railways and in car building plants; have handled men; can furnish A-1 references. PW-396, Elec. Ry. Journal, Phila.

### POSITIONS WANTED

POSITION as general freight agent with electric line; have had 15 years' experience as general express and freight agent; can furnish best of references. George Dimford, 59 Marshall St., Rochester, N. Y.

SUPERINTENDENT transportation; open for engagement after May 1st; 12 years' experience working from the bottom up as motorman, conductor, dispatcher, trainmaster, cashier and superintendent transportation both city and interurban. A-1 reference. PW-393, Elec. Ry. Journal, Chicago.

**CARS FOR SALE**

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

***Get our List and Prices.***

**J. F. DONAHOO CO., Birmingham, Ala.**

WANTED

Direct Current

**ELECTRIC LOCOMOTIVE**

*Address*

**CENTRAL WAREHOUSE CO.**
Minnesota Transfer, Minn.

FOR SALE

## SURPLUS MATERIAL AND EQUIPMENT

All classes of ship construction and Shipyard Plant Construction equipment and material including large quantities of

| | | |
|---|---|---|
| Wood Working Machinery | Marine Equipment and Accessories | Pumping Machinery |
| Machine Tools and Fixtures | Air Compressor Equipment | Scrap Metals |
| Electrical Machinery | Contractors Equipment and Supplies | Lumber |
| Boiler Shop Equipment | Bridge and Gantry Cranes | Deck Equipment |
| Forge Shop Equipment | Steel Plates, Shapes and Bars | Galley Equipment |

All parties interested in the purchase of any of the foregoing classes of material will receive formal invitations to bid periodically as the material is available if they will promptly request that their names be placed on mailing lists for the items in which they are interested.

**SALVAGE—UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION**
140 North Broad Street, Philadelphia, Penna.

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### Eastern Massachusetts

## PARKS

### FOR LEASE

*Fully equipped Parks in Eastern Massachusetts, located in:*

**Haverhill (population of 50,000)**
**Gloucester (population of 25,000)**
**Brockton (population of 100,000)**
**Taunton (population of 40,000)**
**Dighton (one-half way between Fall River, population of 120,000, and Taunton, population of 40,000).**
**Westwood (population of 1500).**

*These parks are owned by an electric railway, which prefers to lease them for private operation rather than to operate them themselves.*

***For full particulars address***

**BAY STATE STREET RAILWAY CO.**
**Wallace B. Donham, Receiver**
Box 5227. Boston. Mass.

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### Sale of Government-Owned

## (New) Telegraph, Telephone and Other Electrical Materials

Sealed bids will be opened

### 10 A. M., MAY 21, 1919

at War Dept., Surplus Property Div., Munitions Bldg., Washington, D. C., for any or all of the following: Field Telegraph Sets, Relays, Sounders and Type-A Buzzer Connectors; Aerial Cable Rings; Linemen's Test Sets and Climbers; No. 4 Por. Knob Insulators, No. 1 Buffalo Grips, 6-ft. Cord Test Leads, No. 18 Type-C Lamp Cord, Rubber and Friction Tape. Particulars, location of material and special bid forms can be obtained at above Office or Zone Supply Offices following Cities: Boston, New York, Philadelphia, Baltimore, Atlanta, Newport News, Jeffersonville, Ind., Chicago, St. Louis, New Orleans, San Antonio, Omaha, El Paso and San Francisco. Refer to S.P.D. No. 556 M.E.

---

## 300 K. W. Westinghouse Rotary Converter

550 v., D. C., Substation complete with transformers (11,000 v.-387 v.), switchboard, lighting arresters, choke coils, etc.

## Transformers

3—100 kw. 60 cy., 11,000 v. to 2300 v. Westinghouse oil cooled transformers.

**J. B. STUART**
271 North Broad St., Elizabeth, N. J.

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## Armature Coil Taping Machine

**Saves Time, Labor and Money**

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

**Geo. M. Griswold Machine Co.**
**New Haven, Conn.**

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## RAILS

**15,000 TONS—NEW and RELAYERS**
**NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.**
**RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.**

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

**L. B. FOSTER COMPANY**
Park Building, Pittsburgh, Pa.

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We own and offer for sale a used McKeen Motor 71-Passenger Car, all steel. In first class condition. Write or wire us for further information.

## HYMAN-MICHAELS CO.

**People's Gas Building, Chicago**
**Phone: Harrison 1100**

***New and Relaying Rails*** ***BUYERS OF ABANDONED RAILROADS***

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**SEARCHLIGHT**
**SERVICE**
**SECURES**
**SATISFACTORY**
**SITUATIONS**

2003

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## WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc **Remember our initials stand for our product.**

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

**EST. 1895** **4732-4-6 ST. CLAIR AVE., CLEVELAND** **INC. 1918**

## ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
*Telephone* 4337-4338 *Rector*

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### *IMMEDIATE DELIVERY*

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**
*Cars and Trucks, Snow Sweepers, Electric Locomotives*
111 West Monroe Street, Chicago, Ill.

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FOR SALE

## Cars

15—30-ft. Pay-Within Cars, Complete, 2 W.H. 306 Motors, AA3 Air Brakes, Brill 22-E Trucks.
5—43-ft. Interurban Cars, complete, 4 G. E. 57 Motors, Air Brakes, Brill 27-A Trucks.

## Motors

20—G. E. 1000 Motors, complete.
10—W. H. 12-2A Motors, complete.
20—G. E. 800 Motors, complete.
2—W. H. 506 Motors, complete

## Controllers

10—K 12 Controllers.
60—K 11 Controllers.
10— K10 Controllers.

**W. R. Kerschner Company, Inc.**
50 Church St., New York City, N. Y.

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## Some One Wants to Buy

the equipment or machinery that you are not now using.

This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

**Sell it *Before* depreciation *Scraps* it.**

*The Seachlight Section is helping others —let it help you also.*

805

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## SURFACE CONDENSERS

1—8000-sq.ft. Alberger.
1—6000-sq.ft. Wheeler Cond. & Eng'g Co.
3—4000-sq.ft. Wheeler Cond. & Eng'g Co.
1—2900-sq.ft. Willans-Robinson.
1—2800-sq.ft. Wheeler Cond. & Eng'g Co.
1—1380-sq.ft. Worthington.
1—1200-sq.ft. C. H. Wheeler.
1—1150-sq.ft. Wheeler Cond. & Eng'g Co.
1— 700-sq.ft. Wheeler Cond. & Eng'g Co.
1— 525-sq.ft. Frick.

**MacGovern & Company, Inc.**
114 Liberty Street, New York, N. Y.
Pittsburgh Office, 498 Union Arcade Building

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FOR SALE

## 4 Wason Paye Cars

28 ft. over corner posts
Standard O-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**
Commonwelth Bldg., Philadelphia, Pa.

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## Cars, Rails, Locomotives, Cranes, Generators, Turbines, Motors, Machine Tools, Hammers, Presses

Everything For
POWER, RAILROADS, INDUSTRY, CONTRACTORS

What do you want to Buy or Sell?
Write for our Bulletin No. 119.

***Our ENGINEERING DEPARTMENT will Design, Construct and Finance your undertakings. Send us particulars.***

**RAILWAY & POWER EQUIPMENT CO.**
Woolworth Bldg., New York, N. Y.
Cable Address: "Johnscar" Code, Western Union.

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## STREET CARS

(4 ft. 8½ in. gage)

**3—32 ft. Closed**

*Complete with equipment. First-class*
*Will convert to one-man type*

**4—9 Bench Open Trailers**

***Immediate Shipment***

**ZELNICKER IN ST. LOUIS**

*Get bulletin* 250 (250,000 *Cir.*) 88 *pages*
**Railway Power Plant & Industrial Equip.**

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## *Get* YOUR *wants into the* SEARCHLIGHT

0084

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Rectifiers.**
Holden & White, Inc.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Automobiles and Buses.**
Brill Co., The J. G.
White Co., The

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles.**
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Carnegie Steel Co.
General Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Babbiting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The

**Bankers and Brokers.**
Coal & Iron National Bank.

**Batteries, Dry.**
Johns-Manville Co., H. W.

**Batteries, Storage.**
Electric Storage Battery Co.

**Bearings and Bearing Metals.**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co
General Electric Co.
Kerschner Co., Inc., W. B.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Holden & White, Inc.

**Bearings, Oil-less, Graphite, Bronze and Wood.**
Bound Brook Oil-less Bearing Co.

**Bearings, Roller and Ball.**
Gurney Ball Bearing Co.

**Bearings, Roller and Ball**
S K F Ball Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Watson-Stillman Co.
Western Electric Co.
Zelnicker Supply Company, Inc., Walter A.

**Boiler Cleaning Compounds.**
Johns-Manville Co., H. W.

**Boiler Coverings.**
JohnsManville Co., H. W.

**Boiler Tubes.**
National Tube Co.

**Boilers.**
Babcock & Wilcox Co.

**Bond Testers.**
American Steel & Wire Co.
Lincoln Bonding Co.

**Bonding Apparatus.**
Electric Railway Improvement Co.
Lincoln Bonding Co.
Ohio Brass Co.

**Bonding Tools.**
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers**
Ronald Press Co.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Piling and Lumber.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Creaghead Engrg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters.**
Holden & White, Inc.
Westinghouse Trac. Brake Co.

**Brake Shoes.**
American Brake S. & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Elec Truck Co.
Wheel Truing Brakeshoe Co.

**Brakes, Brake Systems and Brake Parts.**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
British Westinghouse E. M. Co.
Columbia M. W. & M. I. Co.
General Electric Co
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

**Bridges and Buildings**
American Bridge Co.
Thompson- Starrett Co.

**Brooms, Track, Steel or Rattan**
Zelnicker Supply Company, Inc., Walter A.

**Brushes, Carbon.**
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co., Inc.
United States Graphite Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
United States Graphite Co.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Eureka Co.

**Buckets.**
Blaw-Knox Co.

**Bunkers, Coal**
American Bridge Co.

**Bushings, Case-Hardened Manganese**
Bemis Car Truck Co.

**Bushings, Graphite and Wooden.**
Bound Brook Oil-less Bearing Co.

**Cars, Dump.**
Differential Car Co.

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)**

**Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
Thomas Perley A.
St. Louis Car Co.
Watson Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.

**Cars, Self-Propelled.**
British Westinghouse E. M. Co.
Electric Storage Battery Co.
General Electric Co.

**Cars, Section, Motor**
New Way Motor Co.

**Castings, Brass, Composition or Copper.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & M. Co.

**Castings, Gray Iron and Steel.**
American B. S. & Fdry. Co.
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M I. Co.
St. Louis Car Co.
Standard Steel Works Co

**Castings, Malleable and Brass.**
American Brake S. & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., C. N.

**Ceilings, Car**
Pantasote Co.

**Change Carriers**
McGill Ticket Punch Co.

**Checks, Employees,**
American Railway Supply Co.

**Circuit Breakers.**
Cutter Co., The.
General Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors, for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co., The
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Cleaners & Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)**
Briill Co., The J. G.
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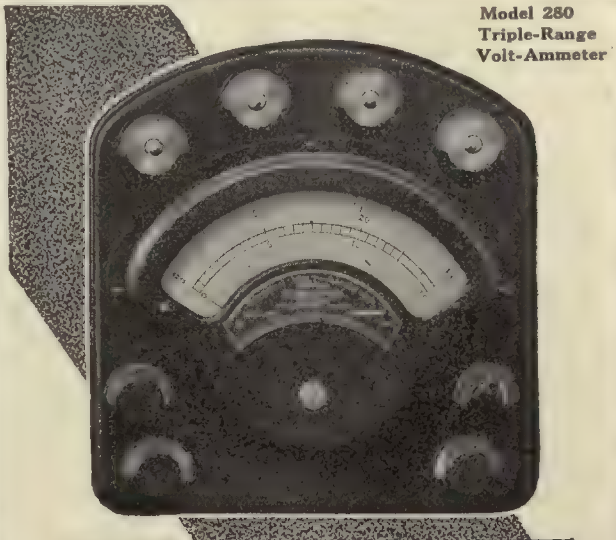

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- **Resistance, Wire and Tube.**
  - General Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**
- **Rheostats.**
  - General Electric Co.
  - Westinghouse Elec. & M. Co.
- **Roofing, Car**
  - Pantasote Co.
- **Roofing Building.**
  - Johns-Manville Co., H. W.
  - Standard Paint Co.
- **Roofing, Car.**
  - Johns-Manville Co., H. W.
- **Rubber Specialties of all kinds**
  - U. S. Rubber Co.
- **Sanders, Track.**
  - Brill Co., The J. G.
  - Cleveland Fare Box Co.
  - Columbia M. W. & M. I. Co.
  - Electric Service Supplies Co.
  - Holden & White, Inc.
  - Ohio Brass Co.
  - St. Louis Car Co.
- **Sash Fixtures, Car.**
  - Brill Co., The J. G.
- **Sash, Metal Car Windows.**
  - Hale & Kilburn Corp.
- **Seating Material. (See also Rattan.)**
  - Brill Co., The J. G.
  - Pantasote Co.
- **Seats, Car.**
  - Brill Co., The J. G.
  - Hale & Kilburn Corp.
  - Peters & Co., G. D.
  - St. Louis Car Co.

# WHAT AND WHERE TO BUY

- **Second-Hand Equipment. (See Searchlight Section.)**
  - Archer & Baldwin
  - Cleveland Armature Wks.
  - Duquesne Elec. & Mfg. Co.
  - Electric Equipment Co.
  - Exell Mfg. Co.
  - Foster Co., L. B.
  - Griswold Machine Co., G. M.
  - Hyman Michaels Co.
  - Kerschner Co., Inc., W. R.
  - MacGovern & Co.
  - Zelnicker Supply Co., W. A.
- **Shades, Vestibule.**
  - Brill Co., The J. G.
- **Shovels.**
  - Hubbard & Co.
- **Shovels, Power.**
  - Allis-Chalmers Mfg. Co.
- **Signals, Car Starting.**
  - Electric Service Supplies Co.
  - Consolidated Car Heating Co.
  - National Pneumatic Co.
- **Signals, Highway Crossing.**
  - Nachod Signal Co., Inc.
  - U. S. Electric Signal Co.
- **Signal Systems, Block.**
  - Electric Service Supplies Co.
  - Federal Signal Co.
  - Nachod Signal Co., Inc.
  - Union Switch & Signal Co.
  - U. S. Electric Signal Co.
  - Wood Co., C. N.
- **Slack Adjusters. (See Brake Adjusters.)**
- **Slag**
  - Carnegie Steel Co.
- **Sleet Wheels and Cutters.**
  - Anderson M. Co., A. & J. M.
  - Bonney-Vehslage Tool Co.
  - Columbia M. W. & M. I. Co.
  - Drew Elec. & Mfg. Co.
  - Electric Railway Equipment Co.
  - Holden & White, Inc.
  - More-Jones Brass & M. Co.
  - Nuttall Co., R. D.
- **Snow-Plows, Removers, Sweepers, etc.**
  - Brill Co., The J. G.
  - Consolidated Car Fender Co.
  - Columbia M. W. & M. I. Co.
- **Soldering and Brazing Apparatus. (See Welding Proc. & App.)**
- **Solderless Connectors**
  - Westinghouse Elec. & Mfg. Co.
- **Speed Indicators.**
  - Johns-Manville Co., H. W.
  - Wood Co., C. N.
- **Spikes.**
  - American Steel & Wire Co.
- **Splicing Compounds.**
  - Johns-Manville Co., H. W.
  - Standard Woven Fabric Co.
  - U. S. Rubber Co.
  - Westinghouse Elec. & M. Co.
- **Splicing Sleeves. (See Clamps and Connectors.)**
- **Springs, Car & Truck.**
  - American Steel & Wire Co.
  - Bemis Car Truck Co.
  - Brill Co., The J. G.
  - Standard Steel Works Co.
  - Taylor Elec. Truck Co.
- **Sprinklers, Track and Road.**
  - Brill Co., The J. G.
  - McGuire-Cummings Mfg. Co.
  - St. Louis Car Co.
- **Steel Forms**
  - Blaw-Knox Co.
- **Steps, Car.**
  - American Mason S. T. Co.
  - Universal Safety Tread Co.
- **Stokers, Mechanical.**
  - Babcock & Wilcox Co.
  - Green Engrg. Co.
  - Westinghouse Elec. & M. Co.
- **Storage Batteries. (See Batteries, Storage.)**
- **Strand.**
  - Roebling's Sons Co., J A.
- **Straps, Car, Sanitary.**
  - Holden & White, Inc.
- **Structural Iron. (See also Bridges.)**
- **Superheaters.**
  - Babcock & Wilcox
  - Locomotive Superheater Co.
  - Power Specialty Co.
- **Sweepers, Snow. (See Snow-Plows, Sweepers and Brooms.)**
- **Switchstands.**
  - Indianapolis Switch & Frog Co.
  - Ramapo Iron Works
- **Switches, Lock.**
  - Weiss Switch Lock Co.
- **Switches, Track. (See Track, Special Work.)**
- **Switches and Switchboards.**
  - Allis-Chalmers Mfg. Co.
  - Anderson M. Co., A. & J. M.
  - Electric Service Supplies Co.
  - General Electric Co.
  - Westinghouse Elec. & M. Co.
- **Tampers, Tie.**
  - Ingersoll-Rand Co.
- **Tapes & Cloth. (See Insulating Cloths, Paper and Tape.)**
- **Telephones and Parts.**
  - Electric Service Supplies Co.
- **Terminal Cables.**
  - Standard Underground Cable Co.
- **Testing, Commercial and Electrical**
  - Electrical Testing Laboratories.
- **Testing Instruments. (See Instruments, Electrical, Measuring, Testing.)**
- **Thermostats.**
  - Consoldiated Car Heating Co.
  - Gold Car Heating & Lighting Co.
  - Holden & White, Inc.
  - Railway Utility Co.
  - Smith Heater Co., Peter
- **Ticket Boxes.**
  - Macdonald Ticket & Ticket Box Co.
- **Ticket Choppers and Destroyers.**
  - Electric Service Supplies Co.
- **Tickets and Transfers.**
  - American Railway Supply Co.
  - Weldon, Williams & Lick
- **Tie Plates**
  - Cambria Steel Co.
  - Midvale Steel & Ordnance Co.
- **Ties, Mechanical.**
  - Dayton Mechanical Tie Co.
- **Ties and Tie Rods, Steel.**
  - American Bridge Co.
  - Barbour-Stockwell Co.
  - Carnegie Steel Co.
  - International Steel Tie Co.
- **Ties, Wood. (See Poles, Ties, etc.)**
- **Tool Steel**
  - Carnegie Steel Co.
- **Tools, Track and Miscellaneous.**
  - Columbia M. W. & M. I. Co.
  - Electric Service Supplies Co.
  - Johns-Manville Co., H. W.
  - Klein & Sons, Mathias
  - Railway Track-work Co.
- **Tools, Thread Cutting.**
  - Williams Co., The J. H.
- **Torches, Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**
- **Towers and Transmission Structures**
  - American Bridge Co.
  - Archbold-Brady Co.
  - Bates Expanded Steel Truss Co.
  - Blaw-Knox Co.
  - Westinghouse Elec. & M. Co.
- **Track, Special Work.**
  - Barbour-Stockwell Co.
  - Cleveland Frog & Crossing Co.
  - Columbia M. W. & M. I. Co.
  - Indianapolis Switch & Frog Co.
  - New York Switch and Crossing Co.
  - Ramapo Iron Works
  - St. Louis Frog & Switch Co.
- **Transfers. (See Tickets.)**
- **Transfer Issuing Machines.**
  - Ohmer Fare Register Co.
- **Transfer Tables.**
  - American Bridge Co.
  - Archbold-Brady Co.
- **Transformers.**
  - Allis-Chalmers Mfg. Co.
  - General Electric Co.
  - Westinghouse Elec. & M. Co.
- **Treads, Safety Stair Car Step.**
  - American Mason Safety Tread Co.
  - Universal Safety Tread Co.
- **Trolley Bases.**
  - Anderson M. Co., A. & J. M.
  - Electric Service Supplies Co.
  - General Electric Co.
  - Holden & White, Inc.
  - Holland Trolley Supply Co.
  - More-Jones Brass & M. Co.
  - National Railway Appliance Co.
  - Nuttall Co., R. D.
  - Ohio Brass Co.
  - Trolley Supply Co.
- **Trolley Bases, Retrieving.**
  - Holden & White, Inc.
- **Trolley Shoes.**
  - Holden & White, Inc.
  - Miller Trolley Shoe Co.
- **Trolley Wire.**
  - American Steel & Wire Co.
  - Roebling's Sons Co., J. A.
  - Rome Wire Co.
- **Trolleys and Trolley Systems.**
  - Ford Chain Block & Mfg. Co.
- **Trucks, Automobile**
  - White Co., The
- **Trucks, Car.**
  - Bemis Car Truck Co.
  - Brill Co., The J. G.
  - McGuire-Cummings Mfg. Co.
  - St. Louis Car Co.
  - Taylor Elec. Truck Co.
- **Tubing, Steel.**
  - National Tube Co.
- **Turbines, Steam.**
  - Allis-Chalmers Mfg. Co.
  - General Electric Co.
  - Terry Steam Turbine Co.
  - Western Electric Co.
  - Westinghouse Elec. & M. Co.
- **Turbines, Water**
  - Allis-Chalmers Mfg. Co.
- **Turnstiles.**
  - Perey Mfg. Co., Inc.
- **Vacuum Impregnation**
  - Allis-Chalmers Mfg. Co.
- **Valves.**
  - Ohio Brass Co.
  - Westinghouse Elec. & M. Co.
- **Varnishes. (See Paints, etc.)**
- **Ventilators, Car.**
  - Brill Co., The J. G.
  - Holden & White, Inc.
  - National Railway Appliance Co.
  - Railway Utility Co.
  - St. Louis Car Co.
- **Vises, Pipe.**
  - Williams Co., The J. H.
- **Volt Meters. (See Instruments.)**
- **Washers.**
  - Bound Brook Oil-less Bearing Co
- **Water Softening and Purifying Systems.**
  - Scaife & Sons Co., Wm. B.
- **Weed Killers**
  - Chapman Chem. Engr. Co.
- **Welded Rail Joints.**
  - Lincoln Bonding Co.
- **Welders, Portable Electric.**
  - Electric Railway Improvement Co.
  - Indianapolis Switch & Frog Co.
  - Lincoln Bonding Co.
- **Welding Processes and Apparatus.**
  - Electric Railway Improvement Co
  - General Electric Mfg. Co.
  - Indianapolis Switch & Frog Co.
  - Lincoln Bonding Co.
  - Metal & Thermit Corp.
  - National Railway Appliance Co.
  - Westinghouse Elec. & M. Co.
- **Wheel Grinders.**
  - Wheel Truing Brake Shoe Co.
- **Wheel Guards. (See Fenders and Wheel Guards.)**
- **Wheels, Car, Cast Iron.**
  - American Steel & Wire Co.
  - Assn. of Mfrs. of Chilled Car Wheels
  - Bemis Car Truck Co.
- **Wheels, Car. (Steel and Steel Tired.)**
  - Bemis Car Truck Co.
  - Carnegie Steel Co.
  - Standard Steel Works Co.
- **Wheels, Trolley.**
  - Anderson M. Co., A. & J. M.
  - Bayonet Trolley Harp Co.
  - Bound Brook Oil-less Bearing Co
  - Columbia M. W. & M. I. Co.
  - Electric Railway Equipment Co
  - Electric Service Supplies Co.
  - Eureka Co.
  - General Electric Co.
  - Electric Railway Equipment oC.
  - Hensley Trolley & Mfg. Co.
  - Holden & White, Inc.
  - Holland Trolley Supply Co.
  - Johns-Manville Co., H. W.
  - More-Jones Brass & M. Co.
  - Nuttall Co., R. D.
  - Star Brass Works
- **Whistles, Air.**
  - General Electric Co.
  - Ohio Brass Co.
  - Westinghouse Traction Brake Co
- **Wire Rope.**
  - American Steel & Wire Co.
  - Roebling's Sons Co., John A.
- **Wires and Cables.**
  - Aluminum Co. of America
  - American Electrical Works
  - American Steel & Wire Co.
  - Bridgeport Brass Co.
  - D & W [illegible] Co.
  - General Electric Co
  - Okonite Co.
  - Page Steel & Wire Co.
  - Roebling's Sons Co., John A.
  - Rome Wire Co.
  - Standard Underground Cable Co
  - Westinghouse Elec. & M. Co.
- **Wood Preservatives.**
  - Lindsley Bros. Co.
- **Woodworking Machinery**
  - Allis-Chalmers Mfg. Co.
- **Wrenches.**
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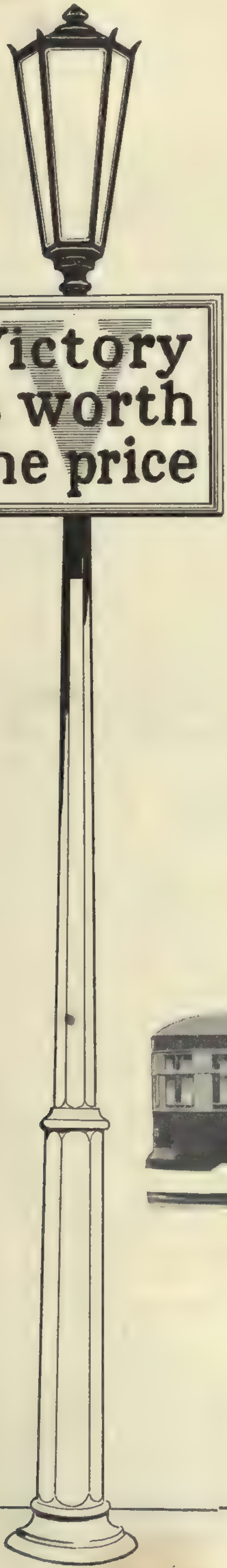
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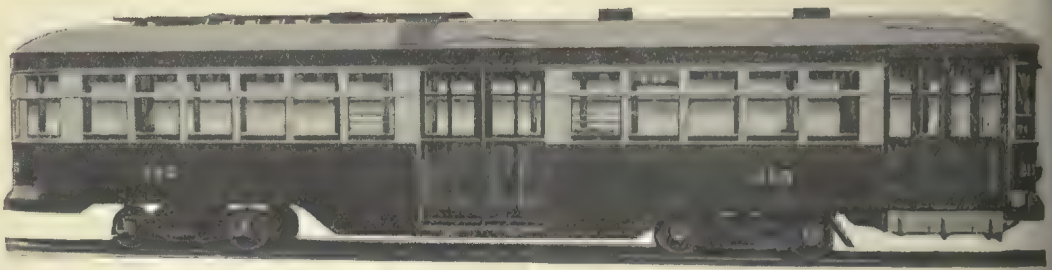

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SAFETY
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The public has signified its appreciation of the improved service by material increase of patronage on lines where safety cars are run. In addition, a marked reduction in operating costs has been effected through the use of these cars.

# GENERAL ELECTRIC COMPANY

aw-Hill Company, Inc. May 10, 1919 Fifteen Cents Per Copy

# ELECTRIC RAILWAY JOURNAL

**DAVIS STEEL WHEEL**

High Mileage

and low maintenance cost are responsible for the use of Davis Steel Wheels on over 350 roads today.

This train on the Key Route of the San Francisco-Oakland Terminal Railways is equipped with Davis Steel Wheels.

American Steel Foundries
1100 McCormick Bldg. Chicago

# HL

## "THE" Control

The Trade Mark Guarantees
Durability and Reliability in Service

Nine new center-entrance, all-steel interurban cars of the Wheeling Traction Company, Wheeling, W. Va., have just been equipped with HL Control and quadruple Westinghouse No. 532 motors.

**Westinghouse Electric & Manufacturing Company**
**East Pittsburgh, Pa.**
**Sales Offices in All Large American Cities**

W
WESTINGHOUSE
ELECTRIC

# Westinghouse

*Vol. 53, No. 19* New York, May 10, 1919 ***Pages 899 to 944***

# Electric Railway Journal

H. W. BLAKE, *Editor*

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### Diesel Engines Prove to Be Economical at Lincoln

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Advertising Indexes—Alphabetical, 50; Classified, 44, 46, 48; Searchlight Section, 42, 43

# Operating History of Westinghouse Turbine Units of 30,000 Kw. and Higher

Three 30,000-Kilowatt Westinghouse Cross Compound Turbine-Generator Units at 74th Street Plant in New York City of the Interborough Rapid Transit Company. Electrical Characteristics—3-Phase, 25 Cycle, 11,000 Volts. Operating Conditions—200 Lbs. Steam Pressure, 29-Inch Vacuum, 120 Degrees Superheat

*This space will be used to give the operating history of our steam turbine units which have been installed in sizes of 30,000 kilowatts and larger. The series will cover a record to date of their performances, of any troubles they have had, and perhaps some interesting features connected with their use. There will be eight articles, embracing eleven of these large units.*

## ARTICLE NO. 1

### Operating History

Date started:
First Unit, December 29, 1914.
Second Unit, February 24, 1915.
Third Unit, July 28, 1915.

Load factor: approximately 75 per cent.
Maximum load carried: 32,000 kilowatts.

All three units are in daily operation, at an average of 16 to 20 hours per day, their operating record covering a period of 3½ to 4 years. For steam consumption performance, see paper by Messrs. H. G. Stott and W. S. Finlay, presented at May, 1916, meeting of New York Section of A. S. M. E.

The curves on the opposite page have been compiled by Mr. W. S. Finlay, Jr., Superintendent Motive Power Interborough Rapid Transit Company, showing in graphic form the capacity availability and economic availability of these three units from dates of first starting until January 1, 1919:

### Capacity Curve

In the *capacity curve* 100 per cent represents the period of time when the unit was available to give its rated maximum continuous capacity. If operative at only part capacity, credit is given for proper percentage of availability. Shut-downs of less than 24 hours for minor repairs, inspection, etc., are not considered as lack of availability, but any shut-downs exceeding 24 hours occasioned by mechanical failures or manufacturer's request for inspection, whether turbine or generator, are recorded as outage periods.

### Economic Curve

The *economic curve* is plotted on the basis of Rankine cycle efficiency and time, and is the ratio of the average Rankine cycle efficiency actually obtained over a range of from 50 per cent to full load, to the efficiency at the particular point or load at which maximum economical operation obtains. The proximity of the availability curve to the 100 per cent line when operating normally, thus indicates the flatness of the turbine's performance curve throughout its working range.

The record begins when the turbine is first turned over under steam after installation and continues up to the first of month during which the curve was prepared.

### Outages

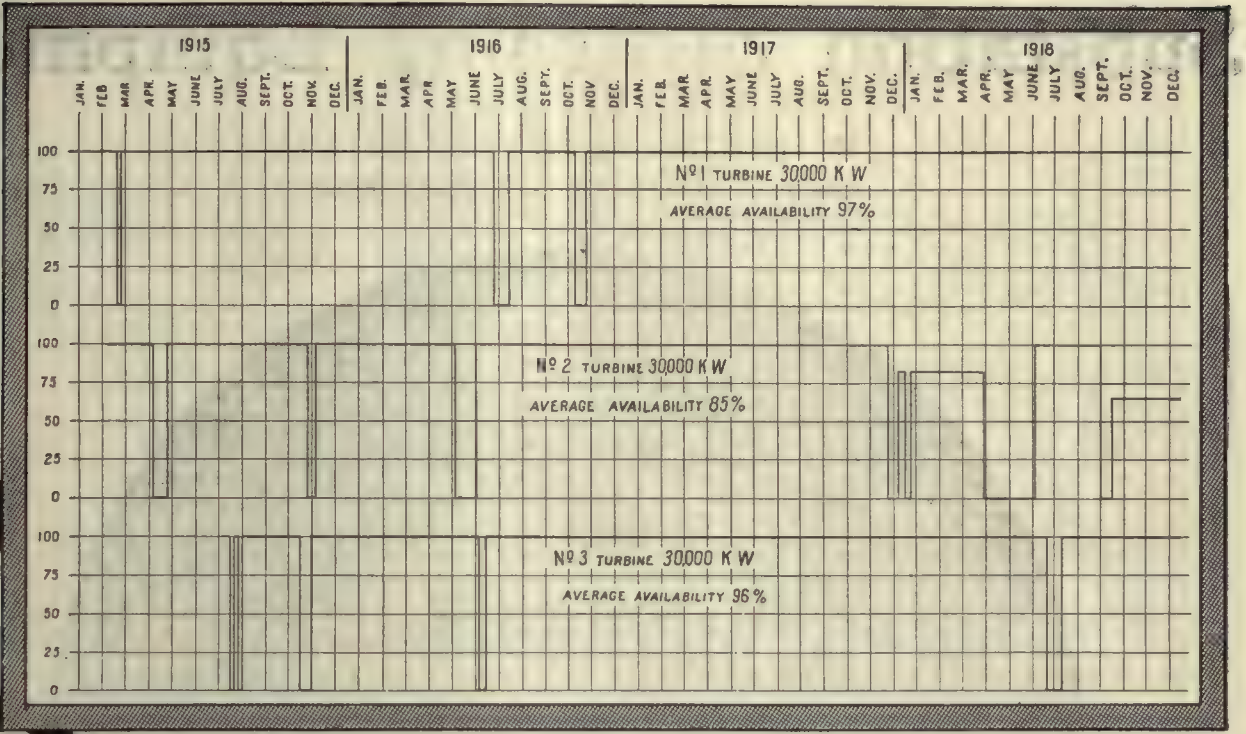
The outages on units Nos. 1 and 3 were quite minor, involving nothing more than inspection, adjustments and minor repairs. No. 2 unit, a duplicate of the other two, has been somewhat less fortunate. The second, third and fifth outages were for inspection and small repairs. The others were due to trouble with labyrinth packing, the exigencies of service requiring the unit to be continued in operation with packing and corresponding stationary blade elements removed until the unit could be spared for permanent repairs. The reason that the degree of less availability varies as between the early part of 1918, and the latter part, both due to packing trouble, is that in the two cases different amounts of blading were removed to overcome the end thrust. It was finally determined that this trouble was due to distortion of the machine caused by insufficient flexibility of high pressure piping.

The long operating record of these turbine units is of particular interest at this time when the economic development of our public utilities has brought the demand for these large and highly economical generating units and has made the question of their reliability a matter of the first importance.

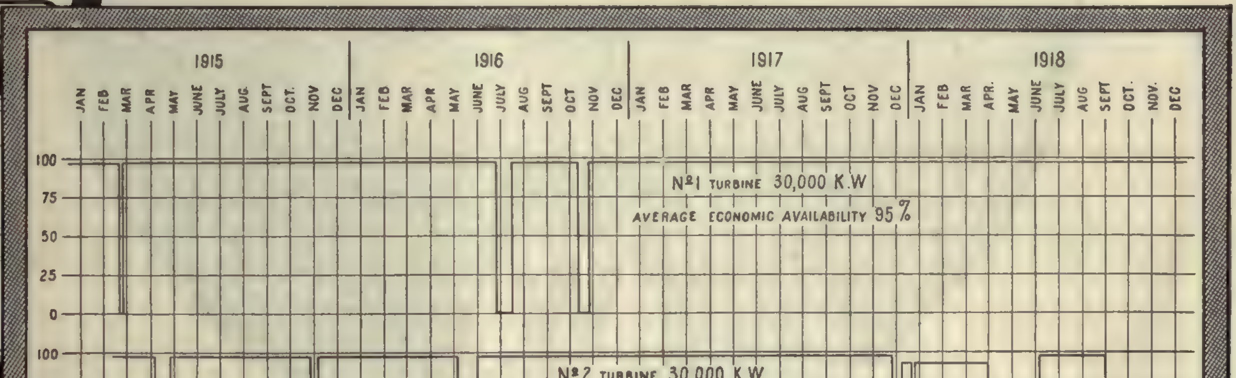
Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pennsylvania

**Westinghouse**

# Relative Capacity Availability.



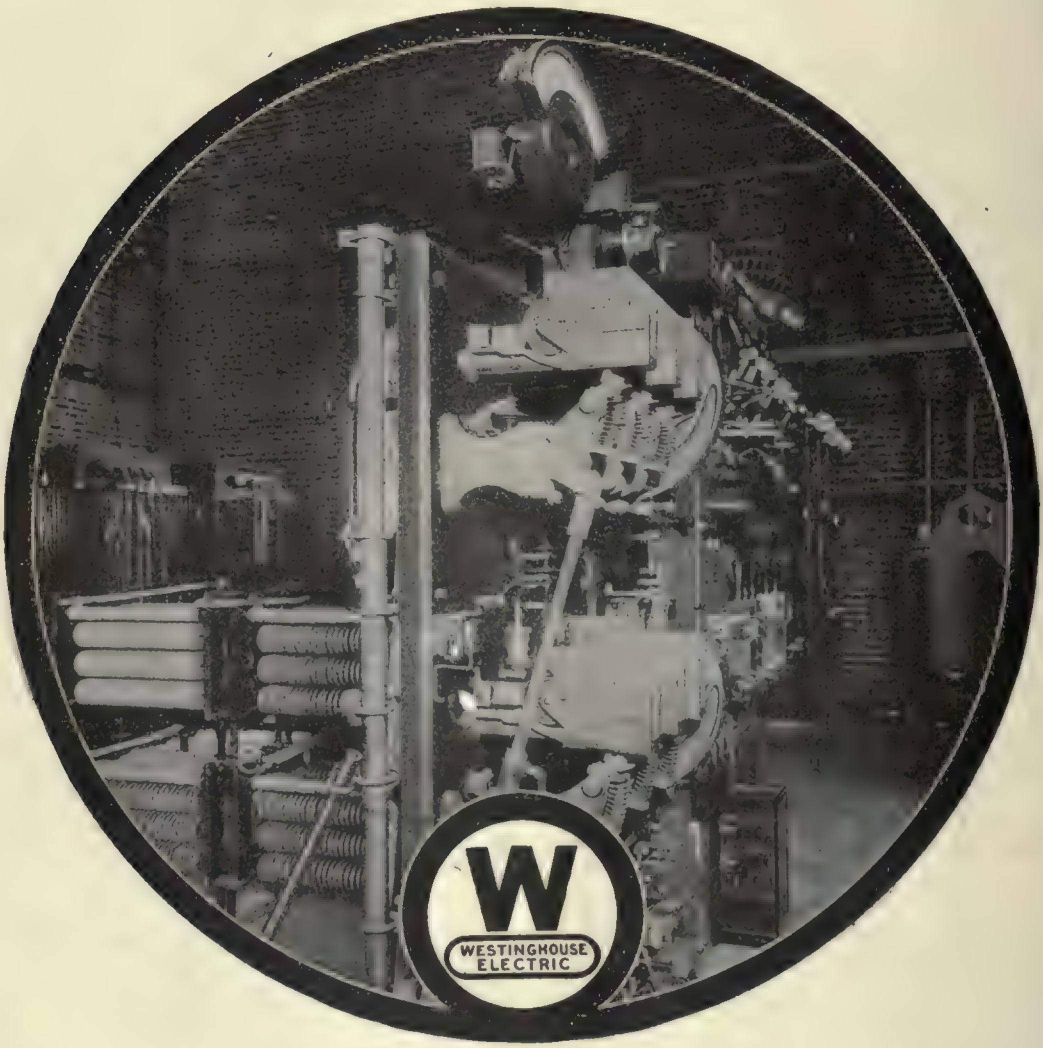
# Economic Availability.



# Westinghouse

Automatic
Substation Switching Equipment

Its great economic value has been amply demonstrated in actual operation



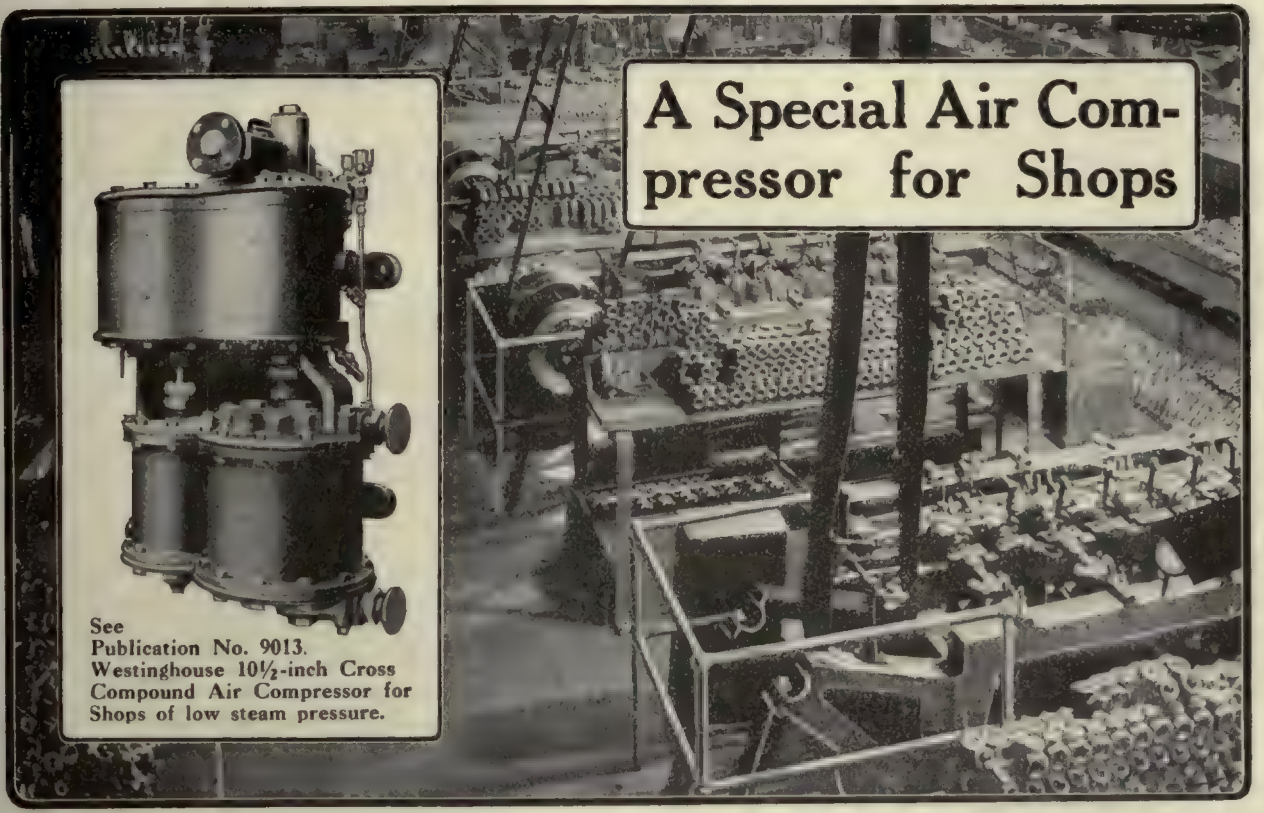
It means substantial savings in operating cost, substation losses, feeder losses, feeder copper, electrolysis difficulties, etc.

While one automatic substation equipment may prove to be a substantial asset, larger economies are realized in ratio to the number of equipments installed.

The services of our corps of experienced application engineers are freely at your disposal to make a study of the possibilities on your system.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Westinghouse


A Special Air Compressor for Shops

See
Publication No. 9013.
Westinghouse 10½-inch Cross Compound Air Compressor for Shops of low steam pressure.

In some few railroad shops the boiler plant is too small and the steam pressure is too low to permit the installation of an air compressor.

**The Westinghouse 10½-inch Cross Compound**

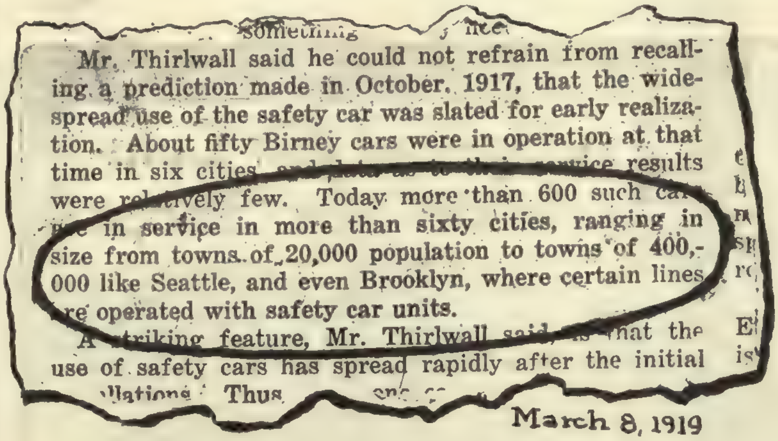
being specially designed for low steam pressure and large air volume, will permit pneumatic tool service where it would otherwise be impossible.

**Westinghouse Traction Brake Company**

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O
Denver, Col.
Houston, Tex.
Los Angeles Cal.
Mexico City
New York, N. Y.
Pittsburgh, Pa.
San Francisco.
Seattle. Wash.
St. Louis, Mo.
St. Paul, Minn.

TRADE MARK



Mr. Thirlwall said he could not refrain from recalling a prediction made in October, 1917, that the widespread use of the safety car was slated for early realization. About fifty Birney cars were in operation at that time in six cities and data as to their service results were relatively few. Today more than 600 such cars are in service in more than sixty cities, ranging in size from towns of 20,000 population to towns of 400,000 like Seattle, and even Brooklyn, where certain lines are operated with safety car units.

A striking feature, Mr. Thirlwall said, is that the use of safety cars has spread rapidly after the initial llations. Thus

March 8, 1919

# 600 Safety Cars in Sixty Cities

"The proof of the pudding is in the eating." Read what the safety car is doing in the States of Washington and Texas.

At Fort Worth the net increase in earnings by the use of thirty safety cars was $78,000 per year, the car mileage having been increased 20 per cent. To improved service was attributed $60,000 increased revenue.

At El Paso, in February, 1918, safety cars were placed on two lines, and 20 per cent more service was given. The receipts on these lines increased 37½ per cent, those of the other lines being unchanged. The power consumption was decreased 45 per cent, and twelve carmen were required for the lines in question instead of twenty-two.

At Tacoma, Wash., thirty-two safety cars on three lines rendered 50 per cent increased service, reduced the platform labor from fifty to forty-two and increased the gross receipts 40 per cent. Ten of the safety cars on a Seattle line are now giving 55 per cent increased mileage and 67 per cent increased receipts, and require twenty-two carmen instead of twenty-nine.

The higher schedule speed that has brought this large increase in revenue is attributed to the Safety Car Control Equipments.

*Equip your cars now. Recapture and create traffic that is obtainable only through short-headway operation.*

# SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
Railway Exchange Building

NEW YORK
City Invest. Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

# OB PRODUCTS

*Quality First*

# Vital Protection with National Guard

It is almost impossible to preserve the alinement of rails at a grade crossing. When the car jars over the rough track there is the ever-present possibility of the trolley wheel leaving the wire—especially if a late car speeds up to beat a train.

Yet then is the most dangerous time for the wheel to come off—unless National Trolley Guard is on duty.

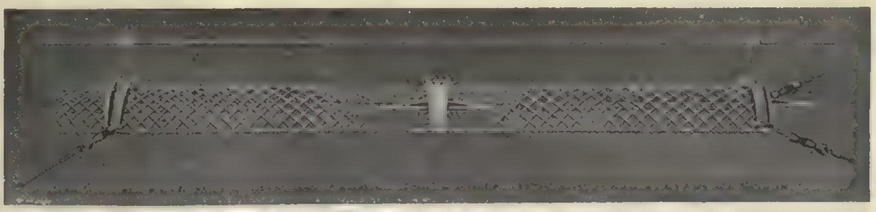
National Guard is made of open wire mesh, formed into a trough and inverted over the trolley. The guard is live and furnishes power to carry car and passengers to safety in case the wheel jumps. *Send for complete data.*

**THE OHIO BRASS COMPANY, Mansfield, Ohio**

**New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco**

*Exclusive sales agents for National Railroad Trolley Guard—Patented*

End view Single Trolley.



Side view Single Trolley (also made for Double Trolley)
Close-ups of National Trolley Guard.—Patented.

# Phono-Electric

## Never Fears the Micrometer

*7 miles of Phono-Electric on the Esplenade Belt Line. Installed 5 years ago.*

On the New Orleans Railway & Light Company lines, it is regular practice to micrometer the trolley wire every six months at three points on each span.

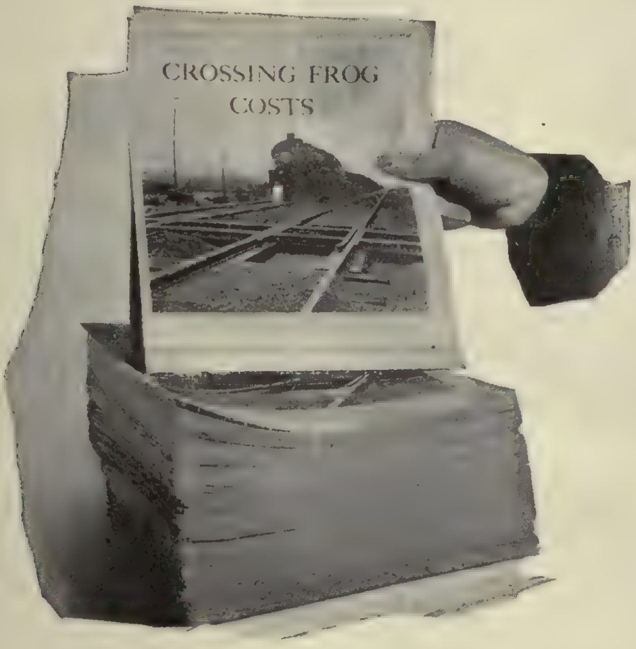
One man takes from nine to ten weeks to carry out this job with the accuracy demanded.

It is this attention to the important matter of longevity that has helped the New Orleans Company reach the decision that

Phono-Electric Wire was a worthy standard.

**Bridgeport Brass Company**

**Bridgeport Connecticut**



# HERE IS *YOUR* COPY!

## Save the Worries and Expense of Crossing Maintenance

THIS new folder just off the press should be in the hands of every maintenance official in this country for his own peace of mind and for the increase in operating efficiency made possible by Steel Crossing Foundations.

International Steel Crossing Foundations are a simple and sensible solution of the *difficult track problem* of maintaining crossings.

The *reduction in maintenance costs and increased life of crossings* carried on Steel Crossing Foundations has brought us repeat orders from roads all over the United States.

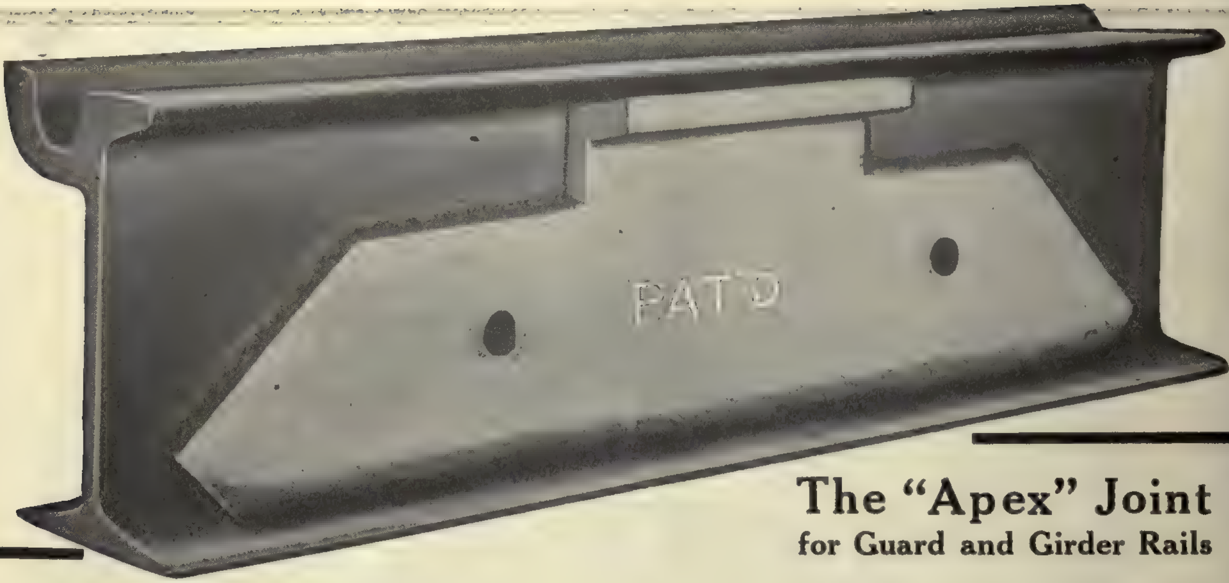
*Progressive maintenance men* will want this brief description of a relief from crossing worries. To get your copy, tear off and mail us the coupon now.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

*Please mail me a copy of your folder on CROSSING FROG COSTS*

*Name*____________________ *Title*________________

*Road*____________________ *City*________________



**The "Apex" Joint**
**for Guard and Girder Rails**

## Don't Let a Poor Joint Offset the Saving of 10 Good Joints

It does not require a large investment to overcome joint troubles and current loss with

# "INDIANAPOLIS"

## "Apex" or "Simplex" Welded Joints

More than 100 electric railways are satisfied that "Apex" and "Simplex" Joints are more economical than temporary repairs—to say nothing of their efficiency. Every Indianapolis joint will be perfect, and show more than 100% strength and conductivity than the rail itself.

***Our literature containing complete facts will convince you. Write.***

**INDIANAPOLIS SWITCH & FROG CO.**
**SPRINGFIELD, OHIO**

**The "Simplex" Joint**
**for High Tee Rails**

*These People Buy Service From You—*
*This Service should include Faraday Car Signal Systems*

Give them Faraday High Voltage Car Signal Systems so that they can easily signal motormen to stop. Faraday High Voltage Car Signals are dependable. Their use assures you of continued operation of signals and the elimination of batteries.

Install them in every car—*Write for literature.*

PUSH BUTTON

RESISTANCE

**ELECTRIC SERVICE SUPPLIES CO.**

*Manufacturer of Railway Material and Electrical Supplies*

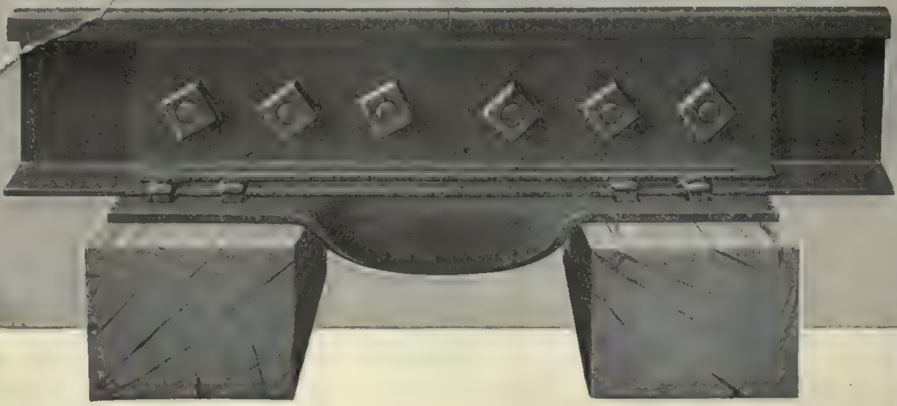
PHILADELPHIA 17th and Cambria Streets
PITTSBURGH 335 Oliver Building
NEW YORK 50 Church Street
CHICAGO Monadnock Building

Flat-ended ABBOTT RAIL-JOINT PLATES

The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

offer the best solution for the joint problem with high T or girder rails in paved streets

The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"



THE flat-end pattern of Abbott Plate gives the joint a strong unfailing support that preserves track surface and keeps the rail ends from battering and does so without imposing any obstructions to interfere with paving. The blocks or bricks will fit close against the joint without chopping or the use of special shapes.

The relief of the splice bars from excessive wheel load greatly prolongs their useful life by reducing the wearing and cutting from back action and also lessens the tendency of holes to shear and nuts to loosen.

Many installations of long standing have demonstrated an appreciable saving in renewals and maintenance costs, to say nothing of the smoother riding qualities of the track.

Abbott Plates are made in patterns and sizes to meet every requirement of new track in electric railway service, and can often be utilized to decided advantage in prolonging the life of old track.

*Write for our Book*
*"Improved Track Appliances."*

312

**Lackawanna Steel Company**

LACKAWANNA, N. Y.

ATLANTA CHICAGO DETROIT ST. LOUIS
BUFFALO CLEVELAND PHILADELPHIA
BOSTON CINCINNATI NEW YORK
SAN FRANCISCO

# Inspection of Equipment on Basis of Work Done

(Patent Applied For)

## *The Economy Power-Saving Railway Meter Provides the Safest and Most Efficient Basis for Equipment Inspection*

Most parts of a car require inspection at intervals proportionate to work done.

Neither mileage run, elapsed time, power-on time or any other time factor correctly measures the work done by the car.

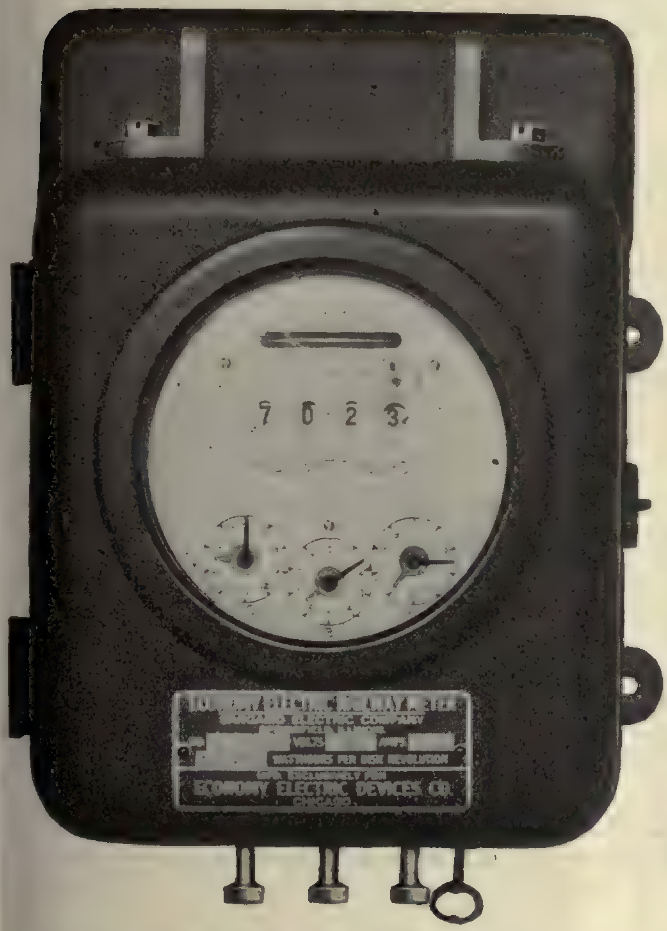
*Kilowatt-hour consumption between inspections is the safest, most effiicient and most readily available measure of work done by the essential parts that wear and need inspecting.*

*The Economy Power Saving and Car Inspection Meter provides a method that accurately and automatically shows when inspection is needed. It also shows at a glance how much more work a car can do before inspection is needed or, in case of a road failure, how much work it has done previous to the failure.*

The result is more thorough inspection without increased labor cost or the previous standard of inspection for less labor cost.

# Car Inspection Dials

## On Economy Power-Saving Railway Meter



*It Meters the Energy—*
*that's what you want to save*

This is a rugged watt-hour meter. Top dials for motormen's power-saving records. Lower dials for car inspection use.

When the meter-driven hand on dial A reaches the marker set for this car at 6, the barn man knows that the brakes and controllers have done their work and are due for an inspection equivalent to that otherwise made daily.

Likewise dial B shows when the car has done sufficient work to require oiling. This supplants the usual time or mileage period for oiling.

Dial C shows when the car has done sufficient work to require general inspection.

After any inspection the meter-driven hand is set back to zero by means of its reset rod at the bottom of the case.

A lock prevents unauthorized resetting of inspection dials.

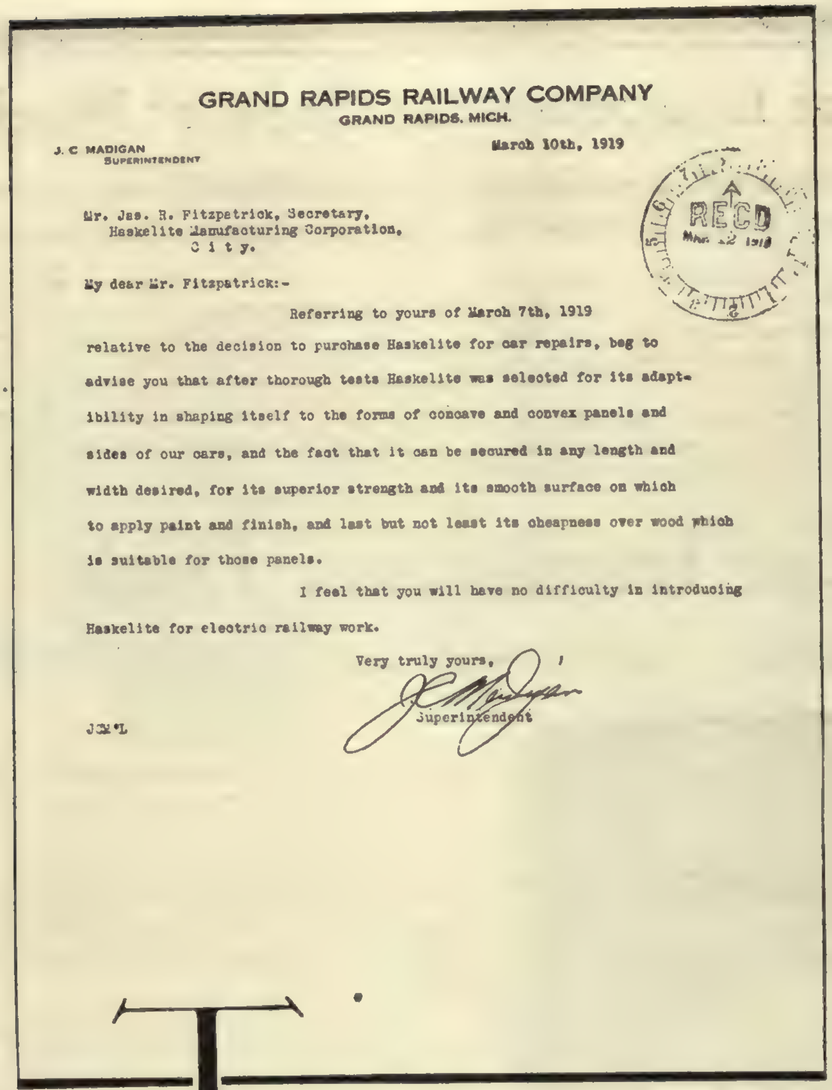
The Economy meter with inspection dials is readily adaptable to any electric car or locomotive operating condition.

It is the only power-saving device whose unit is correct for use in determining when cars should be inspected.

The Economy Railway Meter saves Power and Car House Labor.

# ECONOMY ELECTRIC DEVICES COMPANY

**General Sales Agent:**
**Sangamo Economy Railway Meters, Old Colony Building, Chicago**
**National Railway Appliance Co., New York, Eastern Representatives**



GRAND RAPIDS RAILWAY COMPANY
GRAND RAPIDS, MICH.

J. C MADIGAN
SUPERINTENDENT

March 10th, 1919

RECD
Mar. 12 1919

Mr. Jas. R. Fitzpatrick, Secretary,
Haskelite Manufacturing Corporation,
C i t y.

My dear Mr. Fitzpatrick:-

Referring to yours of March 7th, 1919 relative to the decision to purchase Haskelite for car repairs, beg to advise you that after thorough tests Haskelite was selected for its adaptibility in shaping itself to the forms of concave and convex panels and sides of our cars, and the fact that it can be secured in any length and width desired, for its superior strength and its smooth surface on which to apply paint and finish, and last but not least its cheapness over wood which is suitable for those panels.

I feel that you will have no difficulty in introducing Haskelite for electric railway work.

Very truly yours,
J C Madigan
Superintendent

JCM*L

THIS letter is typical of a number received from the car and vehicle trade since Haskelite was released from war service.

In the influenza epidemic, when street cars had to run with windows open to all kinds of bad weather, Haskelite (which is the only waterproof, heatproof, weatherproof mouldable plywood) was the ideal material for replacements in car seats.

Haskelite is made in any number of plies from 3 upwards; it is made in thicknesses of from $\frac{1}{16}$ to $2\frac{1}{2}$ inches, and furnished in panels measuring any size up to 7 x 54 feet. Complete data compiled by our research engineers will be promptly furnished on application to

THE HASKELITE MANUFACTURING CORPORATION
Chamber of Commerce Building, Chicago Equitable Building, 120 Broadway, New York

HASKELITE

The Waterproof Mouldable Plywood

# *One Man for Two*
## with National Pneumatic Door Engines at Austin, Texas

The first three of these seven safety cars when delivered had manually operated doors and were operated by *two* men.

Today they have National Pneumatic Door Engines (as part of the Safety Car Devices Company's Control Equipment) and are operated by *one* man.

Not on the same schedule but a faster one!

A tip to a live one is enough!

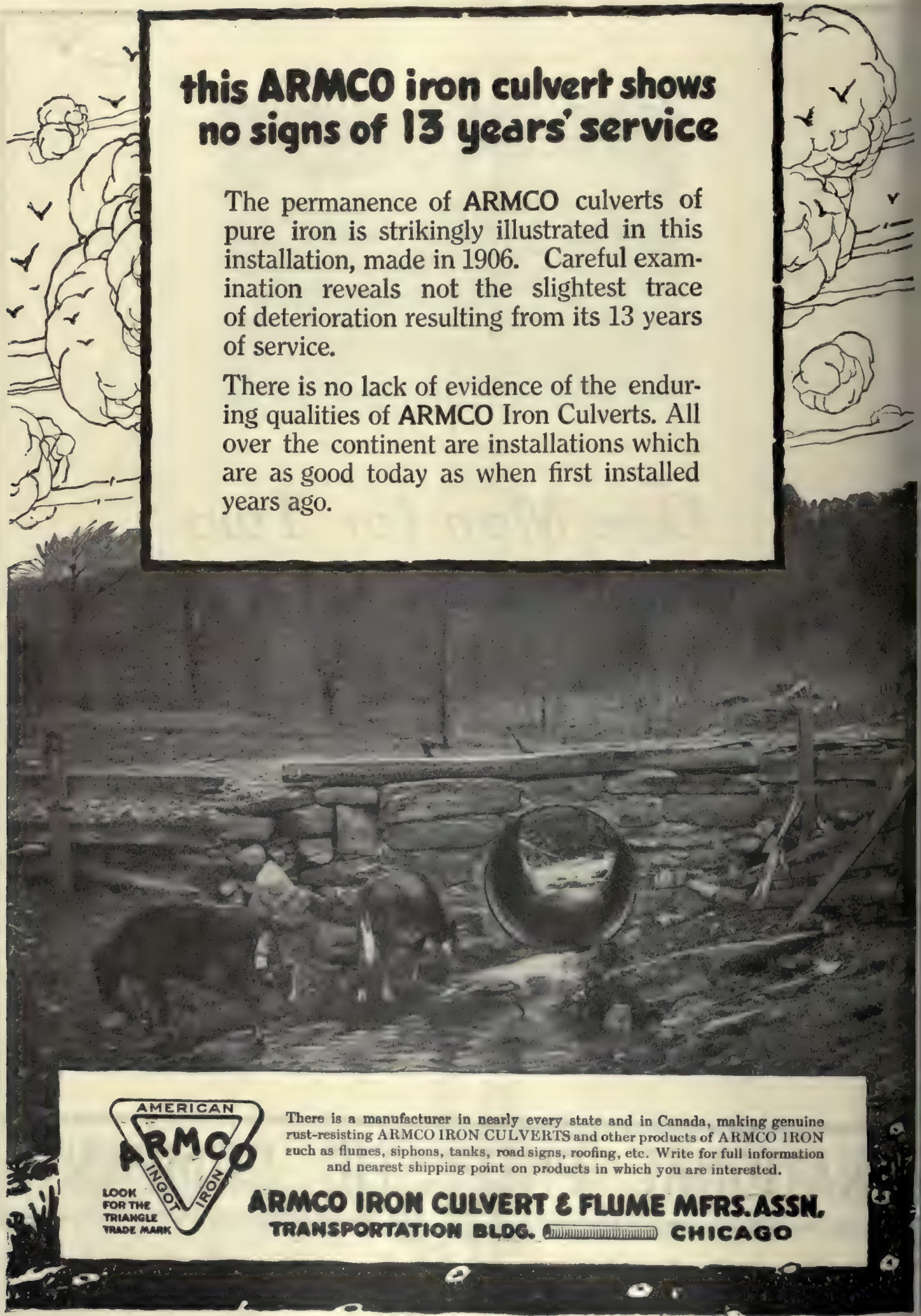
**NATIONAL PNEUMATIC COMPANY**
INC.

50 Church St., New York NPC 515 Laflin St., Chicago

# this ARMCO iron culvert shows no signs of 13 years' service

The permanence of **ARMCO** culverts of pure iron is strikingly illustrated in this installation, made in 1906. Careful examination reveals not the slightest trace of deterioration resulting from its 13 years of service.

There is no lack of evidence of the enduring qualities of **ARMCO** Iron Culverts. All over the continent are installations which are as good today as when first installed years ago.



AMERICAN ARMCO INGOT IRON

LOOK
FOR THE
TRIANGLE
TRADE MARK

There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**
**TRANSPORTATION BLDG. CHICAGO**

# American Troops Entered Los Angeles In 1846

Contrast in your mind the condition of the little hamlet at that time as shown in the above illustration, with the great busy city of today.

And then consider that the foundation of the transformation from a quiet little village sleeping in the California sunshine to an energetic center of hustling commerce has been cemented by the advantages that spring from adequate modern transportation methods.

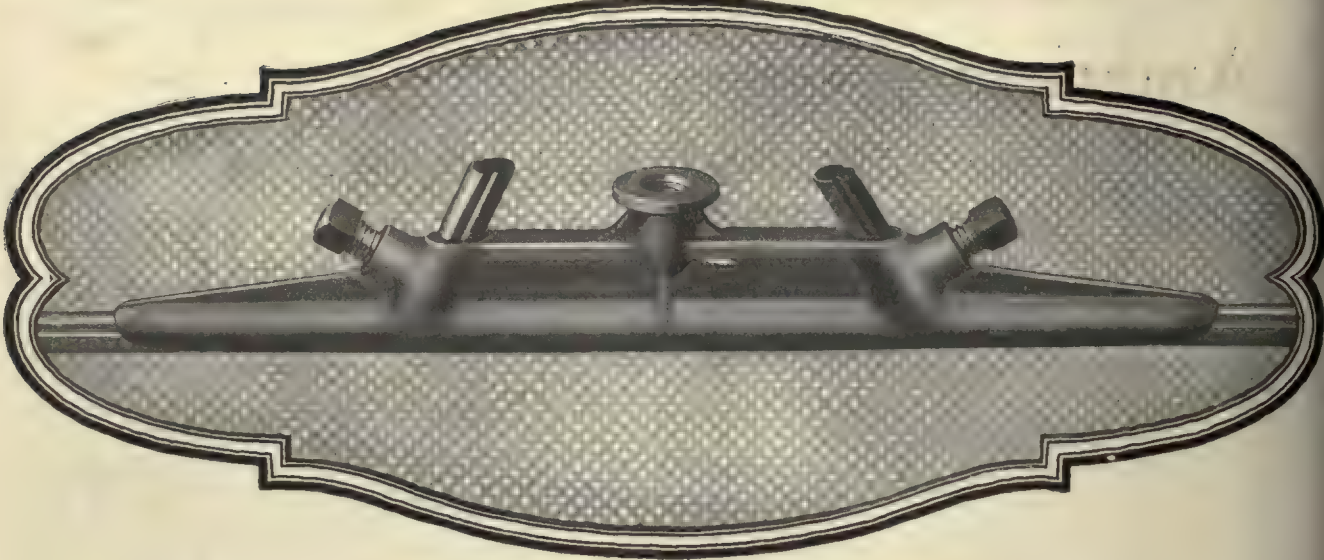
The great transcontinental railway lines that link Los Angeles with every section of the country, the efficient street railway cars that carry its citizens rapidly to and fro in their daily pursuits, the converging interurban lines with their sixty-mile-an-hour cars that tap the country for miles around bringing produce and trade, are nearly all served by

## Galena Oils and Galena Service

Adequate rapid transit service has been a big factor in the upbuilding of Los Angeles, and Galena Service has been a big factor in the progress of transportation methods.

## Galena-Signal Oil Co.

Franklin, Pa.



# No Solder Needed with Form Q Splicing Ears

A wrench is the only tool needed with this splicing ear. No solder is required and wires can be spliced quickly and securely in a very few minutes.

The groove depth approximates the diameter of the trolley wire so that, when the edges are peened down, there is a smooth, unbroken surface for the passage of the trolley wheel, as well as a snug fit for the wire. Ample strength is secured by reinforcing the casting at the bend without, however, interfering with the wheel clearance.

Cup set screws hold the wires in place while the upward curve of the dead ends further safeguard the wires from pulling loose.

The Form Q is a well-formed ear made from a *special composition* that insures long wear. Also, the speed and ease with which it may be installed recommends it to practical railway men.

Form Q ears can be obtained promptly from stock

**General Electric Company**

General Office Schenectady, N.Y.

40-24

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

*Volume* 53 New York, Saturday, May 10, 1919 *Number* 19

## Straight Talk from a Representative Union to Its Members

STATING that "the car employee who believes that the union was organized for the purpose of retaining men in their positions who refuse to do right is fooling no one but himself," the official organ of the trainmen's union in Chicago declares in a recent issue that these men will not be supported in wrong doing. This editorial pronouncement was evidently prompted by the question of a traction official as to why the organization should insist on restoring to their positions men who have been discharged for serious offenses; referring especially to failing to register fares and permitting liquor to interfere with performance of their duties.

On this point the editorial says: "Men who persist in these practices should be game enough to take their medicine when they are caught with the goods, and not try to unload their troubles on the union. Men who willfully do these things are no good to the union or themselves, and there is no reason why the great body of good men in the business should suffer because of their indiscretions. The union cannot support cases of this kind."

Leaders of this union are to be commended for taking this positive stand. Stories about dishonesty of conductors have too long been taken as a matter of course, and it is to the credit of the great body of honest employees that they wish no longer to be associated with such co-workers. Organized labor is coming to take a greater interest in the employer's welfare, and the latter will not be the only beneficiary if union appeals for higher fares and for getting rid of those who tamper with the company's revenues have a successful outcome. If these utilities are once more restored to a position where they are earning a reasonable return we do not believe the employees will have occasion to regret their part in helping to bring about this happy result. Co-operation is a tendency of the times. It augurs well for the future.

## It Isn't Economical to Build Cars to Last Forever

IN VISITING different railway properties in this country one cannot fail to be impressed by the large number of old cars and antiquated types of motors and equipment still in service. With some types of electrical apparatus, as for instance incandescent units, engineers have long since worked out curves which show that it is cheaper to replace them with new lamps after they have had a certain life, rather than continue them longer in service. Manufacturing engineers, from time to time, have tried to impress upon electric railway operating officials the desirability of similar treatment for their entire equipment. It is very difficult, however, to convince a general manager that any equipment which will still operate should be scrapped in order to give way for a more modern type.

At a recent meeting of a committee of the American Electric Railway Engineering Association there was considerable discussion regarding the light construction which is being employed in certain recent types of cars. This suggests that perhaps it would be much better for the electric railway industry if the equipment, instead of being built to last twenty or twenty-five years, was built to last only half as long. The first cost would then be considerably less and there would not be the temptation to continue the equipment in service after its period of usefulness had ended. The automobile business has progressed as rapidly as it has, partly at least because the cars wear out quickly and can be readily scrapped and new apparatus installed.

In this connection an editorial in the July 7, 1917, issue of this paper entitled "Are City Cars Made for Collisions or Passengers?" is à propos. As was pointed out in this editorial, when railways learn to look upon their cars as production units then they will put less money into dead metal and more money into equipment which will produce high acceleration, rapid braking and economical operation. Operating officials should learn to look upon their car equipment as a means for delivering a passenger-mile. Any method of delivering this in the most economical and attractive manner is the best for their railway property.

## The Relation of Rail Steel to Rail Joints on Electric Railways

THERE is an increasing tendency toward the selection of some form of welded joint in track construction in streets. The old cast-weld method has been revived with marked success, while electric arc welds, electric bar welds and thermit welds have also held their own in favor as subdivisions of the general class known as welded joints. The basis of the popularity of all of these is the desire of the track engineer for a continuous rail which is considered the ideal, particularly as the costly item of copper bonding is usually eliminated. The continuous rail, as such, is a success in paved streets because the pavement prevents or retards the injurious action of that old bugaboo "expansion and contraction."

Having long ago banished this deterrent, street railway engineers have since been troubled mainly with the problem of securing the most succesful form of weld required to give the continuous rail. With all of the forms of welds previously referred to there has been a certain percentage of failures, not primarily in the welds themselves but in the rails at or not far away from them. A comparison of chemical compositions of rails which have failed in this way, and general observation as well, have shown a tendency to confine the larger proportion of the breakages to rails coming from one mill. Special trackwork manufacturers find that similar trouble in breakage of iron arms in castings can be traced usually to rail of a particular manufacture.

It would appear from this that there is a big field of investigation open to the new welding society on the subject of the relation of chemical analysis and details of manufacture of rails to the suitability of the steel for adaptation to the several forms of joint welding now current. Robert B. Holt, of Leeds, England, pointed this out in his book on tramway track construction, but we believe that his suggestion has received little attention in this country. Here we have another subject upon which the American Electric Railway Engineering Association could well afford to co-operate in an investigation which should be of great value to the industry. Metallurgical experts should be engaged to assist in the work as no committee member should be expected to devote to it the great amount of time that is necessary for effectiveness in such joint efforts.

## Make Up for Lost Maintenance Time

AN ENORMOUS amount of maintenance work has piled up during war days and while labor and materials are not much less in price, they are at least easier to get. We realize that most companies have little money to spend on maintenance but some of it must be done and the men who are returning from the front will be glad to help in this work. We can thus "kill two birds with one stone," by utilizing their detachment from pre-war jobs to secure their assistance and at the same time bring about a prompt readjustment of labor conditions throughout the country.

There seems to be little reason now to defer work in the hope that prices are speedily coming down, for the chances are strongly that they are not going to do so. Indeed, many competent analysts of the labor field anticipate further increases in prices for the following among other reasons:

The country confronts a labor shortage in the near future. There has not been the customary immigration into the United States which in the past has kept up the supply. At the same time many men have been away from their usual employment for a year or two, and the work which they would have done has not been done, or, at best, has been incompletely performed. During the war an enormous deferment of maintenance, repair and construction work has occurred, and this is due to be made up at once with ultimate overdraft on labor. To be sure, there are local surpluses of men due to cessation of war work and some congestion due to demobilization of troops. Reports of unemployment at many points are disconcerting. This is due, however, to failure of the labor distributing forces of the country to function properly and promptly, and the condition is temporary.

Granted that there will be an actual labor shortage, say in six months or a year, depending upon the speed with which the country gets upon a real peace footing, the conclusion is inevitable that work on track, line, power plant and equipment should speed up at once. We must be near the point at which the effects of deferred maintenance are near the limit. Further postponement will make the work still more difficult and expensive.

## The Diesel Engine in a Railway Power Plant

IT IS a coincidence that in this issue of the ELECTRIC RAILWAY JOURNAL space is devoted to two of the most highly efficient but radically different power generating units, the ultra-large steam turbine and the Diesel oil engine. The turbine has largely displaced earlier types of steam engines, but the Diesel has made slow progress in the stationary power plant field in this country in spite of its many inherent virtues. In view of the comparative meagerness of data as to operating costs of Diesels in the electric railway power plant field, the figures given in this issue for results obtained at Lincoln, Neb., possess particular interest. Every engineer responsible for economical power plant operation needs all of such information that he can get. While he may never expect to use oil engines, he needs an intelligent concept of what engines of this type are and can do.

The Lincoln Traction Company has been using Diesel engines in its plant in combination with steam equipment for nearly three years, with entire satisfaction. The reasons for the adoption of this type of plant are explained in the article. From the data given it is obvious that the Lincoln situation is favorable to the Diesel, due to the high cost of generating energy by steam. The company estimates that during 1918 a saving of more than 0.9c. per kilowatt-hour was realized on all energy generated by these engines over what would have been the cost with steam. This estimate is somewhat vague due to the uncertain element of maintenance, for while it is possible to determine just what has been spent in this direction, it is never quite possible to determine the exact condition of the equipment at the end of a year as compared with that at the beginning.

It is, of course, the high maintenance cost or the fear of incurring such that has made power-plant engineers hesitate to adopt the oil engine. The increasing cost of coal, however, renders maintenance cost relatively less important, and high-efficiency energy transformers such as the internal combustion engine must have more thorough consideration than ever before. In this connection it is well to remember why the engine has an inherently high efficiency and why it is necessarily somewhat complicated and heavy in construction; not forgetting, however, that it requires no boilers or elaborate fuel and ashes handling apparatus, a fact which partly compensates for its limitations.

Internal combustion engines of all kinds transform a reasonable proportion of the energy of fuel into mechanical energy because the fuel is burned in the cylinder where it imparts its expansive power direct to the piston. The temperatures and pressures are high and the radiation losses are not excessive, facts which conduce to high thermodynamic efficiency. The Diesel engine burns heavy oil under favorable heat and energy conditions (high temperature and pressure) with self-ignition. This is accomplished by spraying it in atomized form into the cylinder clearance space behind the piston when that space is filled with air at very high pressure and temperature. The oil is automatically vaporized and ignited, burning so as to provide fairly uniform pressure during combustion.

The mechanical construction needed to permit this simple and effective process to go on is, of course, necessarily rugged and somewhat complicated. This, in addition to the fact that very high-class fitting is needed on account of the high temperatures and pressures, renders the engine expensive to build and entails skilled operation to produce the best results. When, however, one considers the inherently superior qualities of the engine it is no wonder that much study and capital have been invested in its development. And especially in view of the fact, as stated by Dr. Diesel in the writer's hearing: "My engine will burn anything in the way of liquid fuel."

It was in marine work that the Diesel engine first found a large field where the absence of boiler and coal bunker space requirements was naturally quickly appreciated. The stationary plant field is open, however, for fair competition.

## 60,000 Kw. in One Turbo-Generator Unit

IN AN EDITORIAL printed on Oct. 23, 1915, this paper estimated that at the then rate of increase in size of steam turbines the 50,000-kw. unit should materialize in three years. At this writing a 60,000-kw. machine is in operation in one of the great power plants of the Interborough Rapid Transit Company in New York City, somewhat ahead of schedule at the above rate of increase. This is in one sense three turbines in one, as there are three mechanically independent rotors. It is properly rated as one machine, however, because all parts are essential to each other to produce the result desired, and it therefore holds the world's record for single-unit capacity.

As far as heat transformations are concerned this machine cannot be expected greatly to better the record of the 30,000-kw. units in the same station, installed about four years ago. The heat and mechanical conditions in these units were discussed editorially on page 285 of the issue of the JOURNAL for April 24, 1915. It was shown that the total of losses, not inherent in transformation from heat to mechanical work in the range of temperature and pressure used, had been reduced to less than 25 per cent. This is truly remarkable when the possible losses through friction and radiation are considered. The advance marked by the 60,000-kw. machine is rather in the subdivision to permit of more economical use of materials and to provide for partial operation in case a section becomes disabled. In compactness, also, the new machine is a wonder, as it can be circumscribed by a rectangle roughly 50 ft. on a side. In a picture reproduced in this issue there can be seen the new unit and three (all) of the 30,000-kw. machines, a total of 150,000 kw., continuous rating, in only part of the area which but a few years ago sufficed for eight Corliss engines of a combined capacity but slightly greater than that of the latest new unit. This illustrates once more the radical change which has occurred in the practical transformation of energy from latent to kinetic form. It would seem as if the limit of space efficiency had now been reached.

The imagination can only with the greatest difficulty grasp what 60,000 kw., the capacity of the super-turbine, means. To use a device common with orators, we may say that it would propel 2000 city cars of 20 tons weight, operating simultaneously; it would light a string of 20-cp. lamps, placed a foot apart, stretching from New York to Columbus, from San Francisco to San Diego, or from Chicago to Buffalo; it would lift 250 tons vertically at a mile a minute, etc.

## The Basis for the Chicago Rehearing Seems Reasonable

IN FILING its petition for a rehearing of its 7-cent fare case, suggesting a complete revaluation as the basis for a reasonable return upon the fair present value of the properties devoted to the public use, the Chicago Surface Lines has paved the way for developments which may lead to a more happy outcome.

The Illinois commission recently refused the companies' application for an increase in the rate of fare on the ground that the war-time emergency no longer exists and that a change in the rates could not be made without a showing that the present fare does not produce a reasonable return on the value of the properties. Without having heard evidence as to the present valuation of the lines, the commission thereupon arbitrarily eliminated items amounting to some $44,000,000 from the capital account of the companies and decided that the present rate would afford security to the investment.

The Surface Lines management is satisfied that the fair value of the property is in excess of the present amount of the purchase price or the capital account and is willing to stand on the results of an investigation covering this subject. Arguments on this petition are likely to lead to some fine distinctions between valuations for capitalizaton, taxation, purchase or rate making.

Without going into the merits of this debatable subject, which has so long furnished a complex problem for experts, we cannot forebear expressing the belief that, as a matter of equity, the investor should have opportunity to earn a fair return on what he has devoted to the public service whether in dollars and cents, time, energy, ingenuity or effort. But, if the cost of reproduction should be preferred as a basis for rates, there is probably not the same difference in values of many electric railway properties between the two plans as would formerly have been the case.

Thus, in the Chicago surface case, some of the capitalization represents money spent for equipment which has once depreciated in value or has been scrapped, like the old cable apparatus, while part of it represents money spent for property which has appreciated in value. Just how far these fluctuations in value will counterbalance each other is impossible now to say, but one cannot be considered without the other. In other words, if there is an allowance for depreciation there should be one also for appreciation under the cost of reproduction theory. Any other proposal would be based on the principle of "heads I win, tails you lose."

Several other items rejected by the commission in the Chicago valuation for rate making purposes might also in all fairness be restored. One of these, for instance, is the allowance for brokerage in raising money. If we remember correctly, this allowance was to have been taken care of part of the cost service in the Chicago ordinance which failed of passage last November. If the alderman and their special counsel saw fit to offer a return on such expenditures the Illinois commissioners might well give further consideration to the suggestion that it is a proper capital charge. There is strong need for standardization in valuation methods, and we hope for a fair solution of the Chicago troubles after the discussion of this case before the Illinois Public Commission.

# Diesel Engines Prove Economical at Lincoln

### Three 350-Kw. Diesel Units Have Been in Service in This Plant for More Than Two Years in Combination with Steam Equipment — Although Maintenance Cost Is High a Considerable Saving Has Been Realized During the War Period

By O. J. SHAW
Secretary Lincoln (Neb.) Traction Company

THE Lincoln (Neb.) Traction Company operates some 70 miles of electric railway lines together with an extensive lighting, power and steam heating business. It serves a city of more than 60,000 population, with various suburbs in addition. Lincoln is the State capital and the home of the State university, two other universities and several State institutions, but there are few large industries except of an agricultural nature.

The railway system comprises about sixty miles of city track and seventy-five cars. The schedules call for from forty to fifty cars between 6 a.m. and 12 p.m., with one car operating owl service thereafter. The rush hours fall between 7.30 and 8.30 a.m., and 5.30 and 7 p.m. The company also sells power, metered on the switchboard, to the Omaha, Lincoln & Beatrice Railway, a 6½-mile interurban line giving thirty-minute service between Lincoln and its suburbs, and doing a lighting and power business also. In addition to the lighting business in Lincoln the traction company supplies lighting service to from 10,000 to 12,000 suburbanites, the farthest point reached being about 6 miles from the power plant. In every suburban community the energy is sold to the municipality, which resells it to the consumer. The lighting and power peak falls between 7.30 and 9 p.m. in the summer, and 6 and 8 p.m. in the winter.

PART OF LINCOLN TRACTION COMPANY ENGINE ROOM, SHOWING DIESEL ENGINES AT FAR END

The company operates about two miles of steam heating mains, a 16-in. main from the station reaching practically all of the downtown retail district and serving theaters, churches, department stores, etc. Practically all of the steam is the low pressure exhaust from Corliss engines and steam from a bleeder-type turbine in the plant. Live steam is seldom needed.

Typical load curves for the years 1917, 1918 and 1919 are reproduced on page 904. In 1915 the company generated 10,776,910 kw.-hr. of electrical energy and sold 68,588,000 lb. of steam. The operating power station equipment at that time included one 750-kw. Curtis turbine, one 500-kw. Allis-Chalmers-Corliss engine, one 325-kw. Murray-Corliss engine, one 1500-kw. Curtis turbine and one 500-kw. Allis-Chalmers turbine. There was also one 200-kw. high-speed Harrisburg engine not in use. The boiler-room equipment included six B. & W. 250-hp. boilers equipped with Jones underfeed stokers, two Stirling 450-hp. boilers with Jones underfeed stokers, one Stirling 150-hp. boiler equipped with blowers and two Edgemoor 500-hp. boilers equipped with Green chain grates.

In 1916 the lighting demand increased considerably and the demand for steam heat increased more than 20 per cent. The boiler room had reached the limit of its output and it became essential either to increase its capacity or to obtain energy from some other source. A study of the Diesel engine led to the conclusion that the necessary increase in plant capacity could be obtained without increasing the boiler-room capacity by adding engines of this type, with an increase in efficiency of the plant as a whole. Two Busch-Sulzer four-cylinder, vertical, type-B, 500-hp., 200-r.p.m. Diesel engines were, therefore, installed in August, 1916. One is direct-connected to a 350-kw., 2300-volt, 60-cycle, three-phase, alternating-current generator and the other to a 350-kw. 550/575-volt, direct-current generator. The guarantees for these engines provide that with a net load of from 500 b.hp. to 250 b.hp. the fuel-oil consumption will not exceed 6 gal. per 100 b.hp.-hr. to 7.4 gal. per 100 b.hp.-hr. for the two loads mentioned, respectively, the fuel oil to have a heat value of not less than 18,500 B.t.u. per pound, specific gravity at 60 deg. Fahr. not higher than 20 deg. Baumé and not lower than 40 deg., with residue not more than 10 per cent. The speed variation from no load to full rated capacity is not to exceed 2½ per cent from mean.

When the Diesel engines were installed the 1500-kw. mixed-pressure turbine, using low-pressure steam from the Corliss engines and high-pressure live steam when necessary, was sold because uneconomical, and a 1500-kw., 3600-r.p.m., 2300-volt, General Electric bleeder-type turbine was installed on the same foundation.

In November, 1917, one McIntosh & Seymour, four-cylinder, vertical-type, 500-hp., 164-r.p.m. Diesel engine was installed. This is direct-connected to a 350-kw., 550/575-volt, direct-current generator. The maker guarantees that this engine, when carrying between full and one-quarter net load will consume fuel oil of a heating value of not less than 18,500 effective B.t.u. per pound, not to exceed a range between 0.408 lb. and 0.628 lb. per brake-horsepower per hour. The speed variation is guaranteed not to exceed 3 per cent from mean for normal variations in load and the consumption of lubricating oil is not to exceed 2½ gal. per day.

With the installation of the McIntosh & Seymour engine the Harrisburg engine was removed, unit No. 2, a 500-kw. motor-generator set, was moved into line with unit No. 1 and a new 500-kw. motor-generator set was installed in line with these two. A 50-kw. motor-driven G.E. exciter set was also installed. This has sufficient capacity to serve the entire plant.

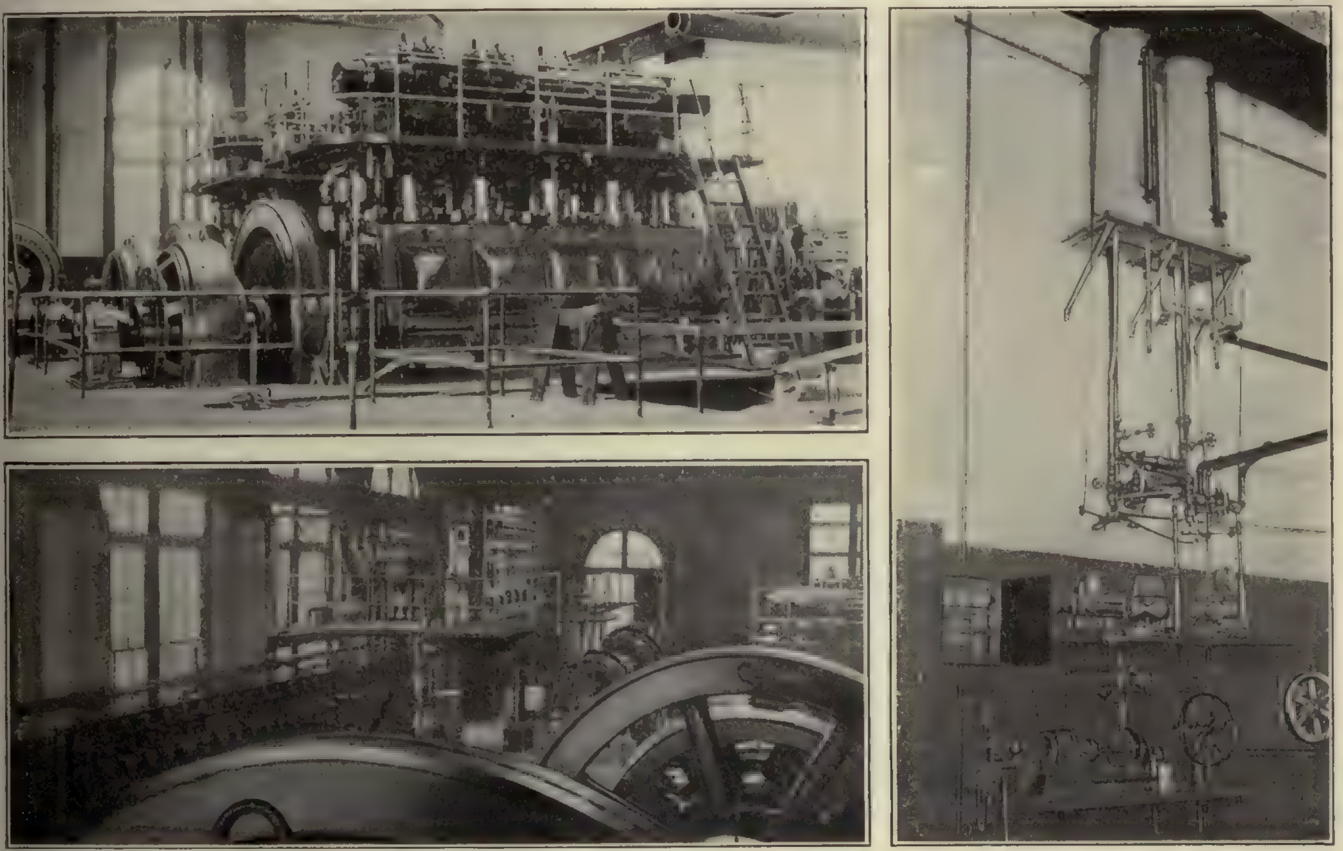
The alternating-current Diesel-engine unit operates in parallel with the 1500-kw. turbine and after midnight during the summer season when there is no heating it carries the load. The switchboard panel for this unit is on the alternating-current switchboard located on the balcony. The direct-current "Diesels" operate in parallel with the direct-current steam engines and motor-generator sets. Their panels are on the direct-current switchboard on the main floor. The alternating-current "Diesel" frequently carries a railway load by conversion through a motor-generator set, but it was installed as an alternating-current unit so that it could carry the lighting load after midnight.

The two Busch-Sulzer engines occupy a foundation approximately 31 ft. (in line with engine axis) by 26 ft. Each engine is, roughly, 10 ft. wide, 22 ft. long (over flywheel) and 11½ ft. high. The McIntosh & Seymour engine is approximately 11 ft. wide, 24 ft. long (over flywheel) and 14 ft. high. If a second unit is added the total floor space occupied will be about the same as that required for the other pair of "Diesels."

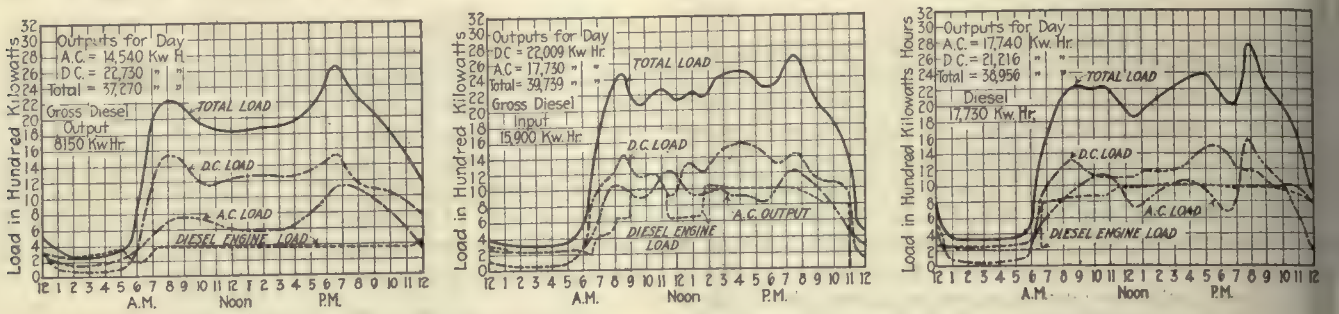
### ROUTES OF FUEL OIL AND COOLING WATER THROUGH THE PLANT

The fuel oil is delivered in tank cars on a spur track and unloaded by gravity to two underground steel drum storage tanks with a capacity of 12,000 gal each. From the tanks it is pumped by small motor-driven pumps, supplemented with an auxiliary hand pump for emergency use, through Worthington piston-type oil meters to auxiliary supply tanks of 30 gal. capacity and located on the wall, about 6 ft. above the fuel oil pumps. Fuel pumps on the engines draw the oil from the auxiliary tanks and feed it, according to the position of the governor, through discharge lines to the needle valves. Air at 1000 lb. pressure is used to force the fuel oil through an atomizer and against a diffusing plate under 500 lb. compression. This operation produces about 1000 deg. Fahr. temperature in the cylinder. It there ignites, burns and expands, giving the necessary pressure for the power stroke.

Another important feature is the cooling water for the engine. This is pumped from wells just outside the plant to a 16-ft. x 16-ft. tank located on the roof of the



AT TOP, LEFT, TWO DIESEL UNITS IMMEDIATELY AFTER INSTALLATION; AT BOTTOM, LEFT, SWITCHBOARD LAYOUT OF LINCOLN PLANT ALTERNATING-CURRENT BOARD ON BALCONY AND DIRECT-CURRENT BOARD ON FLOOR; AT RIGHT, OIL PUMPS, METERS AND AUXILIARY SUPPLY TANKS FOR DIESEL ENGINE FUEL OIL



TYPICAL LOAD CURVES FOR 1917, 1918 AND 1919, SHOWING OPERATION OF DIESEL ENGINES

plant. The pumps are of the vertical, centrifugal type, direct-connected to motors and located in the wells close to the water level. From the supply tanks the water passes by gravity to the jackets on the engine-cylinders, exhaust valves and air compressors and drains to a tank in the basement of the engine room. Thence by means of a small, horizontal, motor-driven pump, approximately 100 gal. per minute is carried back to the supply tank on the roof. This return of part of the cooling water to the original supply is a feature added some time after the installation of the engines. The temperature of the well water is from 50 to 55 deg. Fahr. It was at first found that this was so low as to cause sweating in the air compressors due to the fact that the air drawn in from the room is at approximately 72 deg. Fahr., and is moist from the steam-generating equipment. Water formed in the air compressors drained out and washed out some lubricating oil. The 100 gal. of water per minute now returning from the basement at a temperature of about 110 to 125 deg. Fahr. mixes with the cold well water and gives a resultant temperature of 70 to 80 deg., approximately the room temperature. The air intake has now been placed outside the building and all entering air passes through flannel strainers thus eliminating all dirt and furnishing air not laden with moisture from the steam equipment.

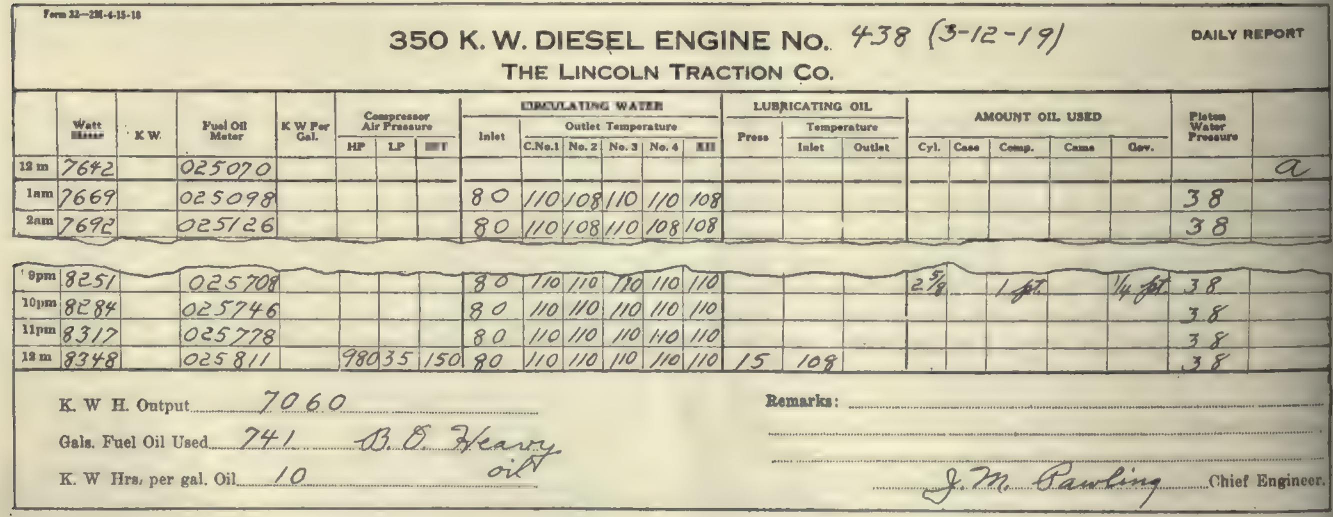
The water from the company wells is very salty. It cannot be used for piston cooling on the Busch-Sulzer engines because when heated the water forms a scale which destroys the efficiency of the cooling operation. City water is used for this purpose and is regulated to 38 lb. pressure. The water purchased from the city also contains scale-forming materials and if raised to a temperature sufficiently high will in cooling deposit a scale which requires an occasional sulphuric acid bath to remove. Failure to remove this scale is liable to result in cracked pistons, and failure to remove the scale from the cooling passages in the cylinder heads will cause these to crack due to the fact that the cooling is not properly performed if the passages are filled with scale.

### RECORD FORMS SHOW OPERATION OF DIESEL UNITS

The Diesel engine daily report reproduced below is one of several kinds of records maintained to furnish data as to operating details of the oil engines. It shows the readings which are taken hourly. The records show that the Diesel unit which operated most nearly at constant full load gave the best efficiency in kilowatt-hours generated per gallon of fuel oil consumed. This unit generated an average of 10.7 kw.hr. per gal. of fuel oil and produced an average output of 303 kw. A pair of fuel-energy graphs is reproduced on the opposite page, showing how the oil consumption and load varied hour by hour on a typical day.

The table on page 905 gives data on the operation of the Lincoln plant for the years 1915 to 1918 inclusive.

It will be noted that during 1917 and 1918 the Diesel engines carried more than one-third the load of the plant; also that the cost of coal per kilowatt-hour generated in 1918 was 1.86 cents while the cost of oil per kilowatt-hour generated was only 0.566 cent. Part of this difference is offset by the increased cost of maintenance of the Diesel engines as compared with the steam units and by the fact that the coal cost also includes that of the coal used for heating, but there is an



Form 32—2M-4-15-18

350 K. W. DIESEL ENGINE No. 438 (3-12-19) DAILY REPORT

THE LINCOLN TRACTION CO.

| | Watt Meter | K.W. | Fuel Oil Meter | K W Per Gal. | Compressor Air Pressure | | | Circulating Water | | | | | | Lubricating Oil | | | Amount Oil Used | | | | | Piston Water Pressure | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | HP | LP | [illegible] | Inlet | Outlet Temperature | | | | | Press | Temperature | | Cyl. | Case | Comp. | Cams | Gov. | | |
| | | | | | | | | | C.No.1 | No. 2 | No. 3 | No. 4 | [illegible] | | Inlet | Outlet | | | | | | | |
| 12 m | 7642 | | 025070 | | | | | | | | | | | | | | | | | | | | a |
| 1am | 7669 | | 025098 | | | | | 80 | 110 | 108 | 110 | 110 | 108 | | | | | | | | | 38 | |
| 2am | 7692 | | 025126 | | | | | 80 | 110 | 108 | 110 | 108 | 108 | | | | | | | | | 38 | |
| 9pm | 8251 | | 025708 | | | | | 80 | 110 | 110 | 110 | 110 | 110 | | | | 2 5/8 | | 1 pt. | | 1/4 pt. | 38 | |
| 10pm | 8284 | | 025746 | | | | | 80 | 110 | 110 | 110 | 110 | 110 | | | | | | | | | 38 | |
| 11pm | 8317 | | 025778 | | | | | 80 | 110 | 110 | 110 | 110 | 110 | | | | | | | | | 38 | |
| 12 m | 8348 | | 025811 | | 980 | 35 | 150 | 80 | 110 | 110 | 110 | 110 | 110 | 15 | 108 | | | | | | | 38 | |

K. W H. Output 7060

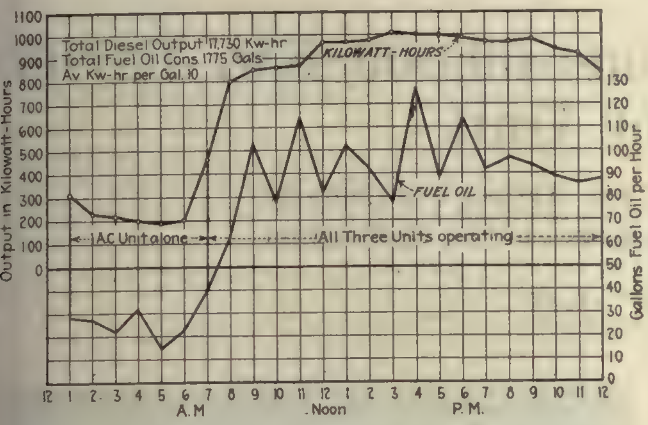
Gals. Fuel Oil Used 741 B. O. Heavy oil

K. W Hrs. per gal. Oil 10

Remarks:

J. M. Pawling Chief Engineer.

DIESEL ENGINE DAILY REPORT SHOWING TYPICAL DATA FOR ONE UNIT



LOAD CURVE AND FUEL CONSUMPTION CHART FOR THREE DIESEL UNITS COMBINED

estimated saving of more than 0.9 cent per kilowatt-hour on all energy generated by the Diesel units. As this amounted to 4,616,086 kw.-hr. the saving effected by this unit was more than $41,000 in one year on switchboard cost.

### VIRTUES AND LIMITATIONS OF THE DIESEL-TYPE ENGINE

The Diesel engine is economical because it will burn a low grade of fuel and upon combustion of the oil, as in the gasoline engine, practically all of the mechanical energy is imparted directly to the piston. The maintenance cost, however, is high. This is still an unknown quantity in the Lincoln plant since records are not kept which permit separating the labor and overhead costs from those of the steam equipment. Since the Busch-Sulzer engine is designed for piston cooling, the local condition of the water in Lincoln has made the lubrication cost of this engine higher than on the other type. Recently the Busch-Sulzer Company has perfected the design of the piston-cooling equipment so that it does not interfere with the lubrication of the engines and the lubrication has been reduced to as little as two gallons of oil per day per engine.

OUTPUT AND COSTS OF OPERATION OF POWER PLANT, LINCOLN (NEB.) TRACTION COMPANY.

| | 1915 | 1916 | 1917 | 1918 |
|---|---|---|---|---|
| Kilowatt-hours generated | 10,776,910 | 11,531,890 | 12,613,994 | 12,907,625 |
| Kilowatt-hours used by railway | 6,161,741 | 6,194,657 | 6,180,776 | 6,076,431 |
| Kilowatt-hours used for light and power | 4,615,169 | 5,337,233 | 6,433,218 | 6,831,194 |
| Pounds of steam sold | 68,588,000 | 83,499,000 | 92,728,700 | 75,643,000 |
| Kilowatt-hours generated by steam | 10,776,910 | 10,062,180 | 8,309,057 | 8,291,539 |
| Tons of coal used | 38,411.51 | 42,652.19 | 35,736.17 | 31,110.43 |
| Average cost per ton | $2.87 | $3.50 | $4.59 | $4.96 |
| Pounds of coal per kilowatt-hour | 7.13 | 8.48 | 8.60 | 7.50 |
| Cost of coal per kilowatt-hour, cents | 1.02 | 1.48 | 1.97 | 1.86 |
| Total cost of coal | $110,339.57 | $149,271.05 | $163,938.99$ | 154,329.60 |
| Kilowatt-hours generated by Diesel engines | none | 1,469,710 | 4,242,377 | 4,616,086 |
| Gallons fuel oil used | none | 136,664 | 395,568 | 427,967 |
| Average cost per gallon of oil, cents | none | 3.14 | 3.70 | 5.66 |
| Kilowatt-hours generated per gallon of oil | none | 10.70 | 10.70 | 10.70 |
| Cost of oil per kilowatt-hour, cents | none | 0.292 | 0.345 | 0.566 |
| Total cost of fuel oil | none | $4,294.12 | $14,646.77 | $24,238.99 |
| Total fuel cost (oil and coal) | $110,339.57 | $153,565.17 | $178,585.76 | $178,568.59 |
| Average cost of fuel per kilowatt-hour, cents | 1.02 | 1.33 | 1.41 | 1.38 |
| Wages of power station employees | $20,967.92 | $24,797.08 | $27,029.13 | $39,320.33 |
| Cost of water | 7,839.49 | 9,699.51 | 7,424.19 | 8,711.05 |
| Cost of lubrication | 1,127.08 | 2,404.24 | 3,851.77 | 4,991.90 |
| Cost of power purchased | 317.26 | 386.32 | 1,898.75 | .......... |
| Miscellaneous expense | 1,902.42 | 2,134.75 | 2,761.34 | 3,548.71 |
| Power plant maintenance cost | 13,136.66 | 11,891.43 | 20,179.56 | 25,376.53 |
| Total cost of power station operation | 155,630.40 | 204,878.50 | 241,730.50 | 260,517.11 |
| Switchboard cost per kilowatt-hr., cents | 1.44 | 1.78 | 1.91 | 2.02 |

The ideal operating condition for the Diesel engine is a constant load. This is true not only because the engine operates at highest efficiency under a constant full load but because the capital tied up in this equipment is so large that no units can afford to stand idle many hours of the day. As a Diesel engine cannot be heavily overloaded to carry a peak and as it is not economical to allow an engine to lie idle or operate on extremely light load many hours of the day the advisable plan for a plant with a load having one or more extreme peaks is either to operate with all steam equipment or enough Diesel equipment to handle the average load and a turbine to take the peak and overload. There is perhaps some objection to a mixed installation of this sort due to the fact that an engineer who can operate steam equipment satisfactorily cannot always operate a Diesel engine equally well. To obtain the most efficient operation of these units and avoid trouble with the equipment a specially trained man is advisable.

A complete Diesel installation is not working at its highest efficiency on a purely railway load due to the liability of heavy load swings. A plant with a constant load twenty-four hours a day offers an ideal opportunity Such a man should be paid more than a steam engineer. for a Diesel engine installation, while any condition under which the engines can operate for even eighteen hours a day with a fairly constant load will give excellent results.

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## War-Time Changes in Living Costs

BETWEEN July, 1914, and November, 1918, the cost of living for wage earners in representative American communities advanced to the extent of from 65 to 70 per cent. The most marked advances were in the cases of clothing and food. This conclusion is presented in *Research Report Number 14* of the National Industrial Conference Board.

During the period in question the average advances in the cost of the separate items entering into the family budget were: Food, 83 per cent; shelter, 20 per cent; clothing, 93 per cent; fuel, heat and light, 55 per cent, and sundries, 55 per cent.

To estimate the total increase in the cost of living the increases found in the separate items must be related to the importance of these in the complete budget. The annual expenditures of the average workingman's family, according to careful investigations by governmental and other agencies, are said to be distributed approximately as follows: Food, 43 per cent; shelter, 18 per cent; clothing, 13 per cent; fuel, heat and light, 6 per cent, and sundries, 20 per cent. A few points' deviation from these averages may occur, but the normal variation is very small.

If the percentages of increase in the cost of the separate items as found in the board's investigation are weighed according to this distribution, the average advance in the cost of living as a whole up to November, 1918, was 65.9 per cent. It is said that no reasonable rearrangement of the budget items to suit individual requirements would greatly affect the average increase in the cost of living as a whole. Other possible combinations, however, would produce increases ranging from 64 to 69 per cent, and to cover this small variation the total increase in the cost of living has been placed at from 65 to 70 per cent.

# Interborough Commissions 60,000-Kw. Turbo-Generator Unit

## Attention Is Directed in This Article Particularly to the Automatic Control Features of the Installation

By W. S. FINLAY, Jr.
Superintendent of Motive Power, Interborough Rapid Transit Company, New York City

THE Interborough Rapid Transit Company, in its Seventy-fourth Street power plant in New York City, has the largest prime mover now in service in the world. The machine is the first of the three-cylinder type of turbine to be put into operation, one of the elements being the high-pressure section and the other two the low-pressure sections. The combined unit has a maximum continuous capacity of 60,000 kw., or 70,000 kw. for two hours. It occupies a floor space of 52 ft. x 50 ft. and at maximum load requires 826,000 lb. of steam per hour.

The unit is designed on what is known as the cross-compound principle. Each element is coupled direct to its electrical generator, and all three elements when in normal operation are tied together electrically. The steam path is such that all of the steam passes through the high-pressure element, then divides equally and flows through the two low-pressure elements. This principle of design, by dividing the work done into separate cylinders, allows the use of smaller individual elements which are inherently stronger than large cylinders; it makes possible an outfit considerably more flexible than a single large unit and more reliable because the turbines are smaller and there is less temperature difference in any one cylinder; and it permits the use of commercially common materials with moderate blade speeds and stresses.

### Normal Load on Each Element Is 20,000 Kw.

The high and low-pressure turbines are proportioned so that with a total load of 60,000 kw. the load will be equally divided among the three elements. In case of failure of one of the low-pressure elements, it would be called upon to carry an abnormal load since all of the steam from the high-pressure element must pass through one low-pressure turbine. To provide against injury to the generator from this cause there is provided a back pressure valve on the exhaust of the high-pressure element which, when the pressure has reached a given amount, will permit steam to exhaust direct to atmosphere. The pressure selected is that which corresponds to a load of 30,000 kw. on the low-pressure turbine, which it is well able to sustain for a half hour. One half-hour is regarded as sufficient time in which to get other units onto the system, when the load on the high-pressure and one low-pressure element of the triple unit may be reduced to the limits of the continuous capacity of the low-pressure generator.

### 40,000 Kw. Is the Maximum-Economy Load

The high-pressure element contains fifty rows of blades, the height of the first row being 4 in. and that of the last row 9 in. The journals are 10 in. in diameter, and the rotor is equipped with a Kingsbury thrust bearing the function of which is to prevent any axial movement of the rotor. Each low-pressure element contains forty-four rows of blades, the height of the first row being 6 in. and that of the last row 15 in. In this element the turbine rotor journal is 12 in. in diameter. The rotor is, like the high-pressure element, equipped with a Kingsbury bearing.

TURBINES HAVING A NORMAL CAPACITY OF 150,000 KW. IN INTERBOROUGH POWER PLANT

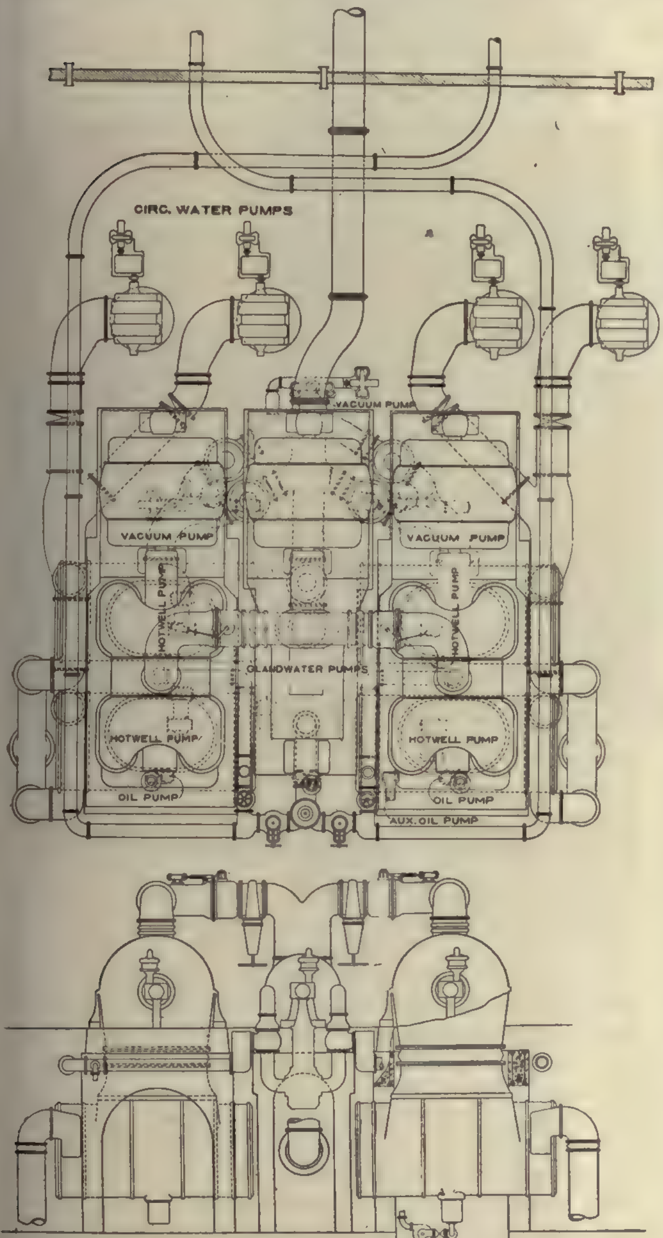
New 60,000-kw. unit in foreground—three 30,000-kw. units in background

In connection with the turbine there are four surface condensers installed, two being connected to each one of the low-pressure elements. The total area of cooling surface is 100,000 sq.ft.

The turbine is designed to operate with steam at 220 lb. per square inch, absolute pressure superheated 150 deg. Fahr. and to exhaust into a 29-in. vacuum. At a load of 40,000 kw., which is the point of best economy of the unit, the high-pressure element will exhaust into the low-pressure element at 29.7 lb. per square inch, absolute pressure, at a temperature of 250 deg. Fahr. This turbine unit is estimated to operate at any load between 30,000 kw. and 60,000 kw. at a water rate which is not more than 5 per cent greater than the minimum.

Each turbine runs at 1500 r.p.m. and its generator delivers three-phase power at 11,000 volts, 25 cycles. Each element has its individual busbars with separate feeders. Installed in the connections between the busbars are reactance coils to limit the flow of current between generators.

Although the unit consists of three separate elements the method of starting the elements from rest preparatory to synchronizing is essentially the same as for single-shaft units. First the field current of all three generators is applied; then the throttle valve on the high-pressure element is partially opened. As soon as the high-pressure rotor starts to revolve it will, through the applied field current, set the rotors of the two low-pressure elements revolving. This causes all three elements to come up to speed together and in correct phase with each other, so that when synchronized with the system they can be connected to the main busbars by closing a single circuit breaker.

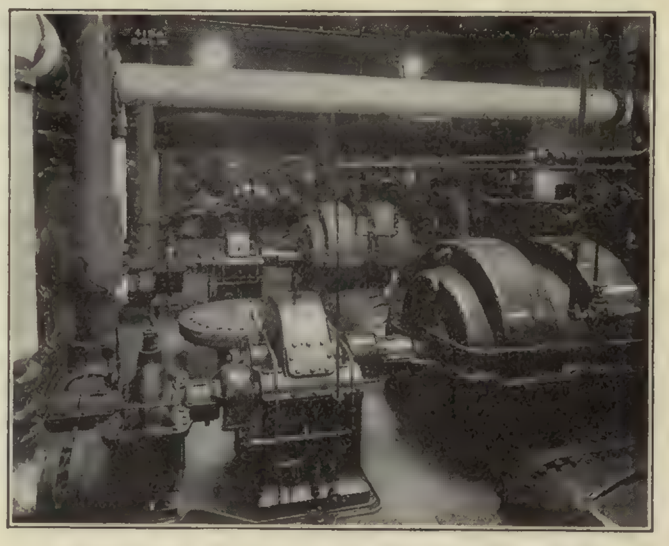


PLAN AND ELEVATION OF 60,000-KW. TURBO-GENERATOR UNIT

The new Interborough turbine unit is of interest not only on account of its size but because unusual attention has been given to the development of automatic features by means of which in the event of trouble with any of the elements it will be automatically cut out of service, the remaining two elements continuing to carry the load.

By the use of an ingenious governing arrangement means have been provided that will permit uninterrupted operation of each individual element, should one or the other two be taken out of service by tripping the automatic stop from any cause not affecting all three elements.

For example, if the high-pressure element is shut down, each low-pressure element will automatically receive high-pressure steam direct from the boilers through its own individual high-pressure steam system, whereas in normal operation the low-pressure elements do not receive any high-pressure steam direct. *Vice versa*, if the two low-pressure elements be shut down, from any cause not affecting the high-pressure element, the high-pressure element will continue operating and automatically exhaust its steam into the atmosphere. Should only one low-pressure element be removed from service, the high-pressure element will exhaust into the remaining low-pressure element. All this governing arrangement is entirely automatic.



CIRCULATING WATER PUMP IN INTERBOROUGH POWER PLANT

## THE GOVERNORS SEEM ALMOST TO HAVE INTELLIGENCE

Since the governing mechanism must control three units, not only when operating together but also when operating separately, several features novel in steam turbine practice are involved. Each unit is provided with an over-speed stop governor which will immediately shut off the steam from that unit if the speed rises above a predetermined amount. Each unit is also equipped with a speed regulating governor of which that on the high-pressure unit is of the customary form. The speed-regulating governors on the low-pressure units are somewhat more complicated.

A butterfly valve, capable of automatic operation, is provided at each connection between the high and low-pressure units which will be automatically closed should the low-pressure turbine speed exceed a predetermined limit. This is tripped shut first by the speed regulating governor should it go to the outer position, and in the event of its failing then by the automatic stop governor. The high-pressure turbine is provided with another exhaust, having a back-pressure valve, so that when necessary the exhaust from the high-pressure turbine may pass to atmosphere and the high-pressure turbine continue to carry its load.

Similarly, if the high-pressure turbine loses its load its governor will cut off steam to the whole system. If the governor does not control the turbine and the speed reaches the predetermined limit, then the stop governor on the high-pressure will close the automatic throttle, similarly cutting off steam from the whole system. The whole system will then slow down until it reaches a predetermined speed lower than normal, when the governors on the low-pressure turbine will cause live steam to be admitted directly to them.

### A DIFFERENTIALLY-OPERATED VALVE CONTROLS THE LOW-PRESSURE LINE

There is a butterfly valve in the low-pressure line which is controlled from the governor of the corresponding low-pressure turbine. Each valve is operated by a differential piston to both sides of which steam pressure is admitted. One end of this cylinder is connected to a valve trip mechanism located at the low-pressure governor and so arranged that when the governor reaches a prescribed position a valve will be tripped open, thus releasing steam from that side of the differential position. Steam pressure on the other side will then quickly force the butterfly valve closed. If the turbine is to be shut down the gate valve is then closed by hand. The butterfly valve may be opened or closed also by a hand-controlled valve.

The valve controlling live steam direct to the low-pressure turbine will begin to open when the low-pressure governor reaches a prescribed position. This valve mechanism does not differ in principle from the main high-pressure valve controlling steam in the system, and is in conformity with ordinary practice for such purposes.

The overspeed stop governor on the high-pressure turbine will close the main throttle valve and the main regulating valve, while that on the low-pressure turbine will bring about the closing of the butterfly valve and the governor and throttle valve, admitting high-pressure steam to the low-pressure turbines.

As part of the throttle valve there is a switch which, when closed, will open the main circuit breaker. Should some accident happen to one of the turbine elements, it may be instantly cut out by operating the emergency stop, which will cause the immediate closing of the automatic throttle. This in turn causes the closing of the switch, which opens the circuit breaker.

The new unit was built by the Westinghouse Electric & Manufacturing Company, but unlike most Westinghouse turbines of moderate capacity it is built entirely on the reaction principle, whereas the custom of this company has been to build its turbines with an impulse high-pressure section. This change is due to the enormous volumes of steam which are to be handled and it permits the use of relatively long blades in the first rows of the high-pressure element.

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The Northern Ohio Traction & Light Company, Akron, Ohio, and the Joliet & Eastern Traction Company, Joliet, Ill., have become members of the electric railway section of the National Safety Council.

# Employees Furnish Tips on Administration

### Connecticut Company's Suggestion Campaign Proves Fruitful—Although Obvious Defects Are Pointed Out, Many Practical Improvements Are Proposed

RECENTLY President L. S. Storrs of the Connecticut Company sent circular letters to all of the company's employees, calling attention to the supreme importance of courtesy and efficiency on the part of all, and also asking the employees to send him suggestions for the improvement of service that had occurred to them. As a result he received several hundred replies, and the suggestions of the men were found for the most part to be of great practical value. There were many that dealt with obvious matters, but among them were hints for improvement of service and conservation of income that showed careful consideration of the company's problems.

The field covered by the suggestion sheets included every department of the company. A painter wrote that he could make certain kinds of paint in the shop where he is employed for much less than the company was paying, and thus reduce the cost of painting cars. His ideas are being tried out. Another employee called attention to lack of signs on certain cars to inform the public that the car passed a certain railroad station, and the deficiency was immediately corrected. Another showed how the company might get more income and save passengers' time by having conductors announce that the cars made a connection with one of the company's own lines to a certain city, instead of dropping passengers at a point where a competing company's lines connected. All of the suggestions were constructive, and there were only three or four that were unsigned.

Examination of suggestions relative to transportation showed that most of the conductors and motormen believe that the skip-stop system discourages trolley riding and drives business to the jitneys on streets where there is jitney competition. There were many suggestions relative to rerouting, and criticisms made by the public were reflected in the suggestions sent in by the men. Many employees urged a return to a 5-cent fare basis, with additional copper-zone fares on long runs. There were literally hundreds of suggestions relative to minor details of operation, and condition of line, equipment and track.

It is significant that the men themselves protested against dishonesty on the part of fellow employees, and did not hesitate to sign their names to such protests. None of them accused any individual of improper handling of funds, but they did make suggestions that certain conditions be looked into, with the result that remedial action could be taken. Among the suggestions was one that the company establish an annual safety prize, with payments to be paid to car operators who go through the year without accidents. Various suggestions for improvement in accounting methods, for better accommodations at amusement parks and kindred matters were made.

Every person who sent in a suggestion received a letter of appreciation from Mr. Storrs, and The Connecticut Company believes that when it makes its next request for constructive suggestions from employees it will receive a great many more than came in response to its first request.

# The Zone Fare in Practice

BY WALTER JACKSON

## BELFAST—PART I

BELFAST CASTLE ON ANTRIM ROAD

### Ireland's Great Industrial City, with 400,000 People, Has Practically No Tenements in the American Sense—Twelve Passengers per Car-Mile Is Average for System Despite Most Unfavorable Routing Conditions for Short Riding and No Tributary Population on the Outskirts

THOSE who see an inevitable connection between the stage fare and the multi-family or tenement house would have their views greatly modified by a visit to Belfast. Here is a city of 14,937 acres and 400,000 people, of whom the poorest classes, and the most numerous, live in tiny brick one-family houses, in striking contrast to the tenements of Edinburgh and Glasgow only a few hundred miles away. To see block after block of these almost microscopic dwellings with their four or five rooms apiece is to realize that national characteristics and topographical conditions are perhaps the most potent factors in the character of housing found at any particular place.

Belfast is free to grow in almost every direction. Its tramway routes, unlike those of many British cities, do not terminate in small, populous communities but end in the open country after a rapid thinning out of traffic in the suburban areas. In this respect the tramways suffer, as there is much less of the pick-up and neighborhood riding that is so prominent in Glasgow's suburbs and its neighboring communities.

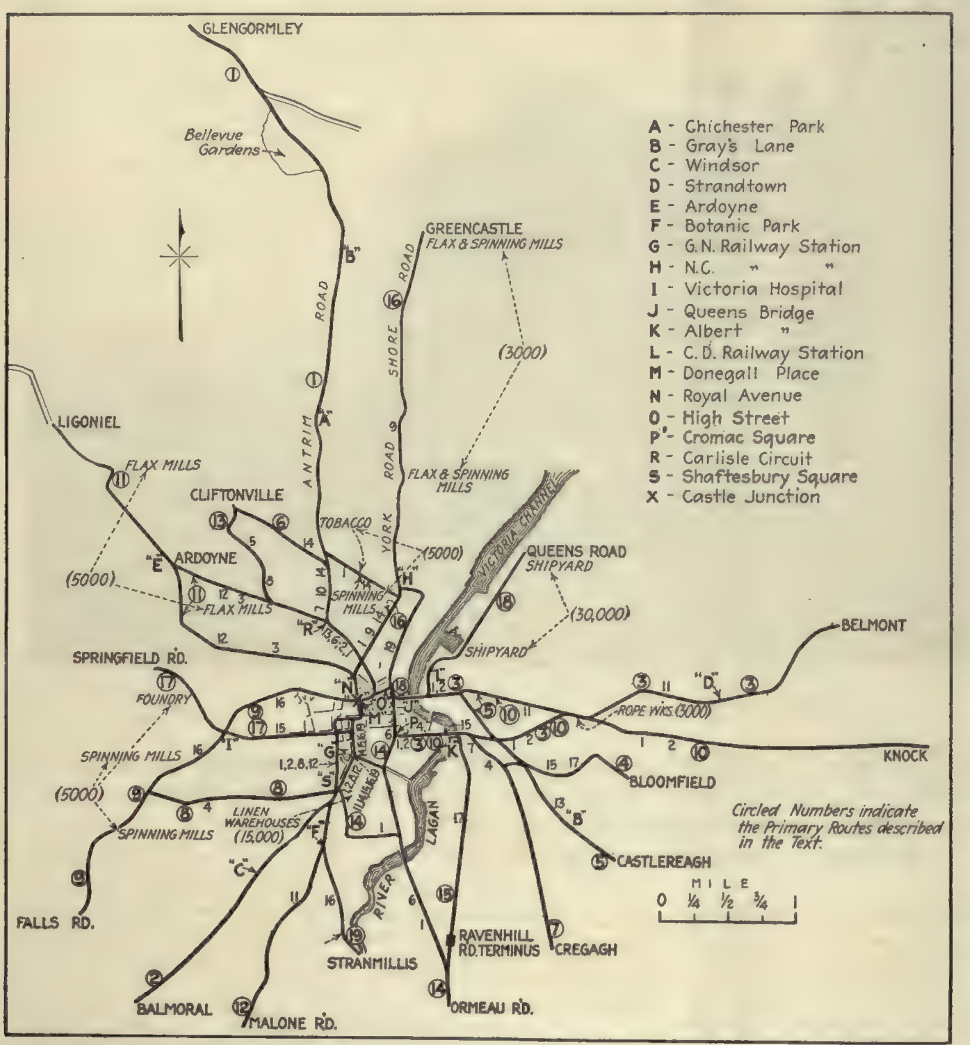
A second cause that gives Belfast a lower density per car-mile than other foreign cities is that its chief industries are so located in or near the town that the majority of the workers are within easy walking distance. This fact is apparent from the map on page 910, but the following figures may prove more convincing:

Of the 20,000 to 30,000 workers at the Queen's Island shipyards, about 8000 ride regularly.
Of 15,000 employees of the linen manufacturers, less than 10,000 ride.
Of 3000 at the rope works, 1000 ride.
Of 7000 flax spinners, 2000 ride.
Of 3000 tobacco workers, 1000 ride.
Of 2000 flax spinners (second group), 1000 ride.
Of 3000 flax spinners (third group), 500 to 600 ride.
Of 2000 at the Ligoniel Mills, 300 ride.

From the foregoing summary it is plain that although Belfast is a great industrial city, it is by no means an ideal tramway town.

A third factor which discourages heavy riding is the long-standing system of alternative routing for the Belfast City Tramways. Instead of radiating to a given terminus as a single line, a number of routes are double-armed and sometimes even triple-armed. The result naturally is that each branch gets only one-half the service that a single straight through route would give in shorter time and with less mileage. Through this scheme some passengers get a shorter walk, but short riding is discouraged since a man who wants to travel a mile or so will not wait for a car on a ten-minute headway. As short headways are quite as important as low fares in attracting the short-haul rider, J. S. D. Moffet, general manager, is giving serious thought to the possibility of one-man car service on some of the less important routes.

To summarize the situation: In a city of 400,000 with 100 miles of single track, with industries close to the homes of the workers, no suburban feeders and no high density of population, the returns for the fiscal year ended March 31, 1918, show earnings of 13.39d. (26.78 cents) per car-mile from traffic receipts, a density of twelve passengers per car-mile and a total travel of 75,416,816 passengers. These figures and others of interest to the operator are set forth in the table on page 913, covering operations for the fiscal years 1912 to date. It is worth pointing out that the tramways, despite the increase in fare, enjoyed the greatest traffic gain in their history during the fiscal year ended March 31, 1918. Not only was the £6,893 deficit of the preceding year absorbed, but a surplus of £11,545 was left as well.



PRINCIPAL INDUSTRIES, ALTERNATIVE CAR ROUTES AND GENERAL LAYOUT OF BELFAST CITY TRAMWAYS

Although the fare revisions began on May 21, 1917, the passengers per car-mile increased from 11.1 in the 1917 fiscal year to 12.0 in the 1918 fiscal year. Such figures indicate that the rates of fare must have been increased with a scientific understanding of what the traffic would bear. The improvement can hardly be ascribed to industrial conditions, because Belfast was a busy city throughout the whole war, and there was no special change during 1917-1918. There were many prognosticators of dire results, but they proved bad prophets! Fig. 1 contains graphs of car-miles and passengers, gross receipts and operating expenses, and cost and revenue per passenger from 1906 to 1918.

### BELFAST ROUTINGS ARE PECULIAR

In view of the peculiarities of the Belfast routing and the comparative sparseness of population along various lines, the following detailed statement of services with route mileages, might well be compared with American practices:

1. *Antrim Road and Glengormley section (route)*, 6 miles long, gives three- to six-minute service to Chichester Park, 2¼ miles out; ten-minute service between Chichester Park and Gray's Lane, 4 miles from city, and twenty-minute service between Gray's Lane and end of line at Glengormley. The greater part of this route is an avenue of fine residences, but beyond Gray's Lane there is nothing until the tiny village of Glengormley is reached. The village is a popular summer resort with a number of tearooms. Formerly the city had a band there, such service being charged against the tramway department. But this is not the worst. About 4 miles out is a rock-walled hill called Bellevue Gardens, on which thousands of pounds have been spent for park development, all charged against the tramways because of the old park fallacy that pleasure travel would pay for it. Although this, the longest line on the system, has been in existence for twenty years and has a well-to-do class of patrons, buildings become scarce almost as soon as the city line is reached. At present, slightly more people are being carried to Glengormley at 4d. than before at 3d., proving that the 1d. increase in the total fare has not stopped whatever development there was.

2. *Balmoral section* is residential. It is 3 miles long. The all-day service to the terminus is ten minutes, but the 2-mile division to Windsor has a five-minute headway during the morning, midday and evening rush hours.

3. *Belmont section* includes both residential and mill territory. It is 3¼ miles long with a twenty-minute service on each arm but ten minutes for Strandtown 2¼ miles out. On this route the overlapping of lines gives the short rider a car every four minutes during the day and every two minutes during the rush hours for a distance of 1¾ miles.

4. *Bloomfield section* is residential. It is a 2¼-mile crosstown line feeding midway between Castlereagh and Knock Road. It has a twenty-minute headway as a war measure.

5. *Castlereagh section* runs through a thinly populated district. It is 2¼ miles long and has a headway of twenty minutes as a war measure with some extra cars turned back ¾ mile from the terminus.

6. *Cliftonville section* is residential and well populated. It is 2 miles long. The normal all-day headway is ten minutes with two or three cars added during the rush hours.

7. *Cregagh section* is a 3-mile residential line which runs to open country. It has a ten-minute headway all day.

WIDE STREETS AND TINY HOUSES IN ONE OF OLDEST PARTS OF BELFAST

8. *Donegall Road section* is 2¼ miles long, running in conjunction with but not using the same track as the Falls Road section. It passes through thinly-populated territory and terminates at the city cemetery. A twenty-minute headway prevails.

9. *Falls Road secticn* is 3 miles long to Andersonstown terminus. It has a ten-minute headway over the entire line and five-minute service to the city cemetery. Traffic on this line ordinarily is moderate but is heavy on football Saturdays.

10. *Knock Road section* serves both a factory and a better-class residential district. A ten-minute service (an absurd alternative twenty-minute service via Queens Bridge and the same via Albert Bridge) is given over the complete length of the road, 4 miles to Knock, and a five-minute regular and three-minute rush service to Knock Road, 3 miles out. This is one of the busiest routes in the city.

11. *Ligoniel section* runs to Ligoniel, 3½ miles out. This is a working-class line with a ten-minute service to the terminus. It has two arms which join at Ardoyne, 2 miles from the center of Belfast. The Shankill Road arm has a base headway of ten minutes with changes to five and three-minute intervals according to needs. The Crumlin Road arm has a normal headway of ten minutes with a few extras during the rush hours. All turnbacks are made at Ardoyne, leaving a ten-minute headway between Ardoyne and Ligoniel. This line is a type of the two-arm routing where a single intermediate line would give a straight instead of a roundabout route and permit so short a headway that walking along the route would be almost elminated. It is true that the walk to and from the car would be increased, but the public would be benefited as it would always find a car in sight.

12. *Malone Road section* is a high-class residential line with a ten-minute service to the terminus. At a point (Botanic Park) 1¼ miles from the center of the city it has a branch to a terminus ¾ mile beyond the park and known as Stranmillis. As this branch also has a ten-minute service, it is possible to give a five-minute service on the joint track.

13. *Old Park section* runs over the Crumlin arm of the Ligoniel route for a distance of 1 mile to Agnes Street and terminates at Cliftonville, making a total length of 2¼ miles through a partly working-class and partly high-grade residential section. The Old Park service proper is ten minutes, but on the 1 mile of joint operation the combined headway is five minutes. This route serves one side of the Old Park territory, while the Cliftonville section serves the other side of the recreation grounds and residences in this part of the city.

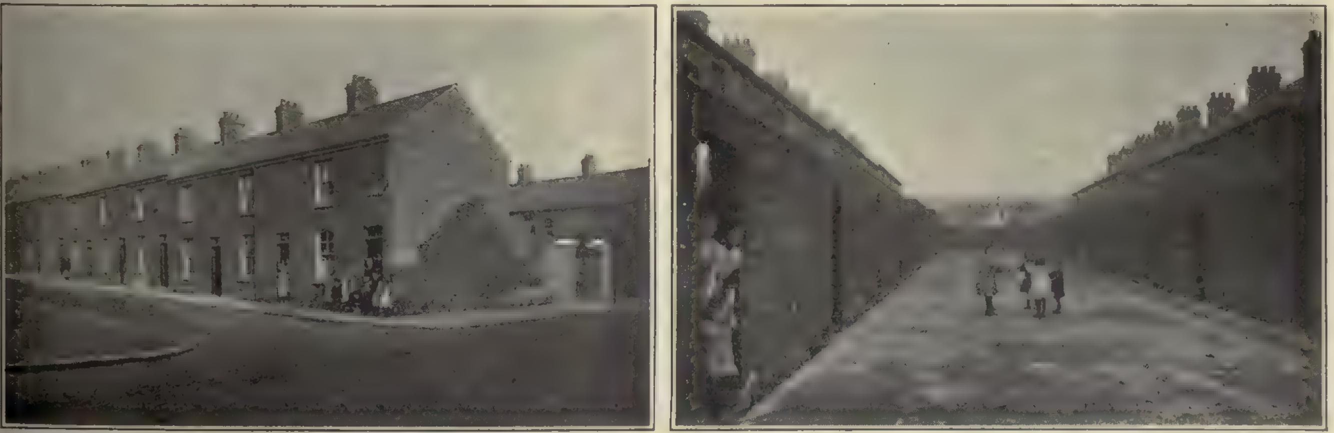
14. *Ormeau Road section,* 2¾ miles long, serves a residential district. It has two arms which join at University Street, 1½ miles from the center of town. Both the Botanic Avenue and Cromac Street arms have individual services of ten minutes, giving a joint service of five minutes in the less populated sections! This is the curious result of starting the alternative routes in the center of the city instead of some point nearer the suburbs.

15. *Ravenhill Road section,* 2¼ miles long, has an individual all-day headway of twenty minutes as a war measure. It is in residential territory running along the Public Park, which is flanked by Ormeau Road on the opposite side, forming a "V" therewith.

16. *Greencastle or Shore Road section,* 3¾ miles long, has a ten-minute headway to the terminus with five-minute service over the first mile. This route serves a working-class district. It passes the station of the Northern Counties Midland Railway, into which a car is run on a stub track every twenty minutes—more often than train connections warrant. This is a possibility for one-man car service.

17. *Springfield Road section* is 2 miles long with a straight ten-minute headway. It serves the Victoria Hospital and the same general territory as the Falls Road section and the Shankill Road route of the Ligoniel section.

18. *Queen's Road section* has extraordinary traffic morning and evening, because it serves the two great shipyards on Queen's Island. These establishments deliver about one-half the morning and evening rush traffic, about eighty cars being used in the morning and a few less at night. Whereas the individual Queen's Road service is simply a ten-minute headway over the 1¾-mile run up to 7 p.m., with no reason



LATEST TYPE OF WORKMEN'S DWELLINGS IN BELFAST WITH PLAYGROUND FOR "CHILDHER" IN REAR for service after that hour, the same tracks during the rush hours are used for through cars to or from every part of Belfast. This through routing involves no extra costs for special work, and it has the advantage of distributing the load to a certain degree. Plenty of the impatient patrons, however, take the first car that leads to Castle Junction—the great gathering point—where they either pay a second fare on a second car or walk the remainder of the way. Of the 20,000 to 30,000 workmen in the shipyards, about 8000 use the cars, and these are disposed of in ten minutes despite unfavorable car-storage and fare-collection conditions. The tracks extend down a narrow street between the yards with few crossovers and no continuous third track that could be used for storage. Passengers pile on pell-mell, since no space is available for the desired prepayment area, but somehow or other the conductors manage to get the fares of everybody except the boys who hang on the outside and drop off before the cars reach the Queen's Bridge into the city. The inbound or morning service is easier, of course, as the fares are collected individually rather than in mass. Eventually, train service may be introduced for the evening operation. As in the case of the Greencastle section, a few cars of the Queen's Road section are run into the County Down Railway station for the convenience of steam railroad patrons.

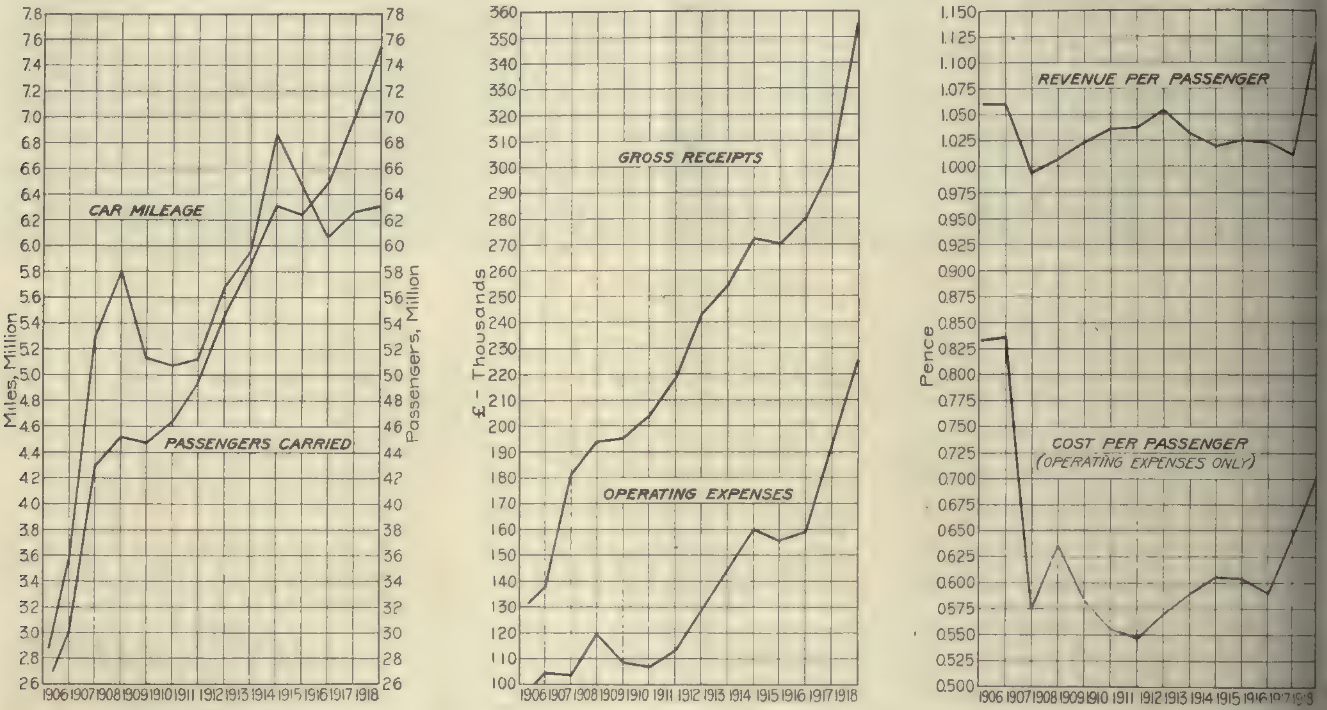


FIG. 1—COMPARATIVE TRAFFIC AND OPERATING STATISTICS OF BELFAST CITY TRAMWAYS FOR 1906-1918

In general, all the services as far as possible are routed over at least two sections (routes). The exception is the Glengormley section, which can be looped in and out of Castle Junction without switching. The bad feature of the present arrangement is that some routes have odd cars (put on to please individuals who were able to influence the Council in their own as against the public interest) routed over several other sections. For instance on the Antrim Road section, services are run from Chichester Park to Ormeau Road, Knock, Cregagh and Balmoral (Windsor), but of the two last one has only a twenty-minute headway and the other consists of only odd cars operated during the middle of the day. The natural result of this multiplication of the "chances of disturbance" is that instead of an even headway at the busy periods, the cars not only arrive at the converging point in groups but travel the remainder of the journey in bunches of twos and threes. In consequence, the service is bad and the road inadequately covered.

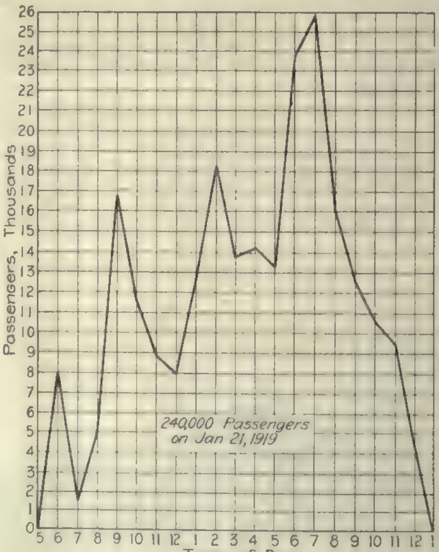


FIG. 2—MARKED MIDDAY TRAFFIC IN BELFAST

**J. S. D. MOFFET**, general manager Belfast City Tramways since October, 1916, came to Belfast from the West Ham Corporation Tramways, of which he was general manager and engineer from 1913 to 1916. From 1904 to his change to West Ham, Mr. Moffet had been general manager of the Rochdale Corporation Tramways. Mr. Moffet has been conspicuously successful in securing increased travel at Belfast despite increases in fare. Educated as an engineer, he believes in applying engineering principles to the sometimes elusive problems of the traffic department, and this belief is illustrated by the various graphic records and principles of analysis used by him in Belfast. Mr. Moffet, as general manager at Rochdale, was a pioneer in the installation of car-checking devices, and at West Ham he secured the adoption of a central telephone control system that was the first and only one of its kind in British or European tramway practice. Mr. Moffet is a native of Sunderland, Durham, England. He has traveled over a good part of the world but never visited America. He is familiar, however, with the latest American practices and before long hopes to introduce some highly advanced traffic devices still unknown to European tramway service.

More normal examples of routing a car over two sections are: Falls Road and Greencastle (Shore Road) sections; Donegall Road and Bloomfield sections; Springfield Road and Ravenhill Road sections; Malone and Ligoniel sections; Old Park and Castlereagh sections; Cliftonville and Ormeau Road sections, and Stranmillis and Northern Counties railway station.

Like other cities of the United Kingdom, Belfast has a pronounced mid-day travel in addition to the usual a.m. and p.m. peaks. This characteristic is clearly brought out in the graph on page 912 of the traffic handled on Jan. 21, 1919. This shows that 17,000 passengers were on the cars at 9 a.m., about 18,300 at 2 p.m. and 26,000 at 7 p.m. The total travel between 5 a.m. and midnight was 240,000. It will be understood, of course, that the actual periods of maximum boarding were say thirty minutes ahead of the time shown on the graph. Aside from the three highest peaks, there will be noted one reaching the total of 8000 passengers at 6 a.m. This, of course, is the early workmen's traffic. How long this will continue is problematical. The present agitation for shorter workdays would, if successful, throw the morning load on top of the 8 to 9 o'clock peak unless the riders concerned could see the advantage of using the hours saved by starting a little later than at present but quitting earlier. In other words, serious discomfort to the public would be avoided by splitting the saving instead of applying all of it to the postponement of the opening hour. Every cloud is reputed to have a silver lining. In this case, if the workmen do prefer to start after 8 a.m. they lose the low-rate fare. Hence the tramways can offer a choice between the staggered hour with the low-rate fare retained, or an accentuated peak with the low-rate fare eliminated.

Malone Road

Cypress Gardens Dunbarton

HOMES IN OUTER PARTS OF BELFAST WHICH INDICATE THAT THE ZONE FARE HAS NO TERRORS FOR THE MIDDLE CLASS

This aspect of the daily traffic curve is by no means unique to Belfast. The agitation for shorter workdays is universal throughout the United Kingdom, and their installation will have effects similar to that indicated at Belfast. It is not likely, however, that noonday riding from mills and sales-shop will be much affected. The habit of going home to luncheon has been so strongly cultivated that many shops are completely closed for one to one and one-half hours at midday.

Service to the extent of handling nearly 250,000 passengers a day is being given now with 291 cars, of which 250 to 260 are in daily use. The schedule speed is exceedingly good, 8.5 to 9 m.p.h., owing in large measure to double-track operation, wide streets and good traffic

RESULTS OF OPERATION OF THE BELFAST CITY TRAMWAYS FROM 1912 TO 1918

| Year Ended March 31 | Traffic Revenue £ | Traffic Revenue per Car-Mile d. | Total Revenue £ | Total Revenue per Car-Mile d. | Working Expenses £ | Working Expenses per Car-Mile d. | Total Expenditure £ | Surplus £ | Car Mileage | Passengers Carried | Average Return per Passenger | Total Working Expenses per Passenger d. | Passengers per Car-Mile |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1912 | 239,263 | 10.12 | 243,068 | 10.29 | 129,343 | 5.47 | 219,197 | 23,871 | 5,671.776 | 54,546,856 | 1.052 | 0.904 | 9.6 |
| 1913 | 250,589 | 10.12 | 254,377 | 10.27 | 143,885 | 5.81 | 238,576 | 15,801 | 5,946,659 | 58,437,942 | 1.029 | 0.979 | 9.8 |
| 1914 | 268,250 | 9.38 | 272,062 | 9.51 | 160,278 | 5.60 | 269,157 | 2,905 | 6,865,591 | 63,131,820 | 1.019 | 1.023 | 9.2 |
| 1915 | 266,249 | 9.93 | 270,237 | 10.08 | 156,913 | 5.85 | 267,014 | 3,223 | 6,432,600 | 62,340,269 | 1.025 | 1.028 | 9.7 |
| 1916 | 275,668 | 10.88 | 280,653 | 11.08 | 159,310 | 6.29 | 272,792 | 7,861 | 6,077,658 | 64,697,292 | 1.022 | 1.012 | 10.6 |
| 1917 | 296,910 | 11.41 | 301,345 | 11.58 | 189,666 | 7.29 | 308,238 | *6,893 | 6,245,012 | 69,582,066 | 1.024 | 1.063 | 11.1 |
| 1918 | 350,385 | 13.39 | 355,056 | 13.57 | 221,967 | 8.48 | 343,511 | 11,545 | 6,279,072 | 75,416,816 | 1.150 | 1.093 | 12.0 |

* Deficit.

NOTE—First fare revision May 21, 1917; second fare revision July 1, 1918.

regulation. Cars attain a maximum free running speed of 16 m.p.h. The same running time is maintained throughout the day. Belfast has no buses, and in view of the good car speeds and the low density of population it is not likely to have any in the near future.

Stops are spaced five poles or 600 ft., and practically all of them are nearside. Safety stops, as is the case with operating speeds through different parts of the city, are specified only by the Board of Trade regulations. They are indicated by red signs, while blue signs identify the regular "by request" stops. At an early date, the railway will make the stopping places still clearer by striping the poles.

At Castle Junction, the gathering point of all the cars on the system, three traffic regulators are stationed to accelerate traffic movement. These men are on duty from 8 to 10 a.m. and 12 to 7.30 p.m. They assume the responsibility of starting off each car so that the conductor can begin earlier to collect fares. As two passengers can readily board the car at one time, no attempt is made to load people in queues. Only the rear platform is used for entrance and exit.

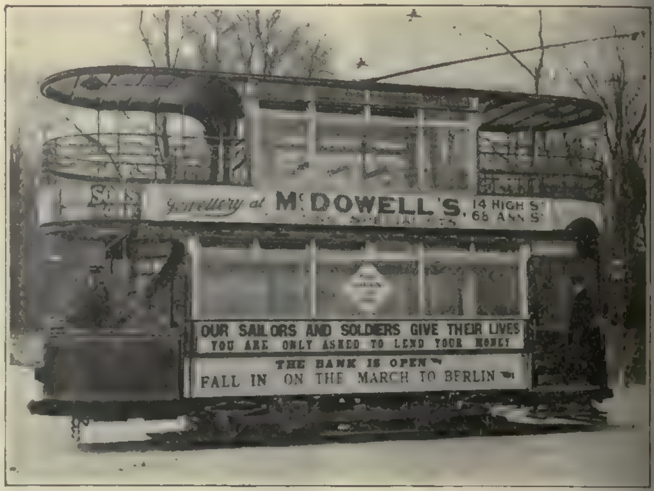
### ROLLING STOCK IN BELFAST

The standard car of Belfast is double-deck with open vestibules and open ends on the upper deck. It is 27 ft. 10 in. over all, with 5-ft. 6-in. platforms, seats twenty-two passengers below and thirty eight above, and weighs 24,640 lb. The cars are mounted on Brush single trucks with two 35-hp. Westinghouse No. 200 motors. The controllers are Westinghouse No. 90 M with electric braking features. Magnetic sanders are also used in operating the slipper brake as an addition to ordinary hand brakes. Illumination is afforded by 16-cp. lamps enclosed in molded glass. The conductor's pull cord is still the only signal device, but push-button signals available for both the passenger and the conductor are under consideration.

CASTLE JUNCTION, THE GATHERING POINT FOR ALL CARS AT BELFAST
(Note booth where traffic regulators make out reports)

Although illuminated roller destination signs are carried over both dash and step, the management is considering the installation of a big route number sign which would be carried from the upper deck so that a prospective passenger would be sure to see it even if a large motor truck or wagon happened to be obscuring the lower deck of the car. Route information boards are placed over the central window of all cars as in common British practice.

An unusual—and appreciated—feature of Belfast car equipment is the installation of Neill clocks. These are electrically operated by means of two Western Electric 2-volt dry cells, "Bluebell" type. The accuracy of these clocks has helped many a passenger make his train.


Jewellery at M^c DOWELL'S, 14 HIGH S^T 68 ANN S^T
OUR SAILORS AND SOLDIERS GIVE THEIR LIVES
YOU ARE ONLY ASKED TO LEND YOUR MONEY
THE BANK IS OPEN
FALL IN ON THE MARCH TO BERLIN

BELFAST DOUBLE-DECK CAR USED DURING A WAR-LOAN RALLY

From the foregoing account, it is apparent that Belfast rolling stock does not differ materially from the usual British double-deck car. In a later issue data will be published concerning the maintenance of this equipment, more particularly the wheels and axles. The second part of this present Belfast article, to be published in the May 24 issue, will show how fare increases have been successfully worked out and how the fares are collected and accounted for.

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## Making Change on Safety Cars

IN CONNECTION with the establishment of safety-car service in Hartford, Conn., Manager W. P. Bristol of the Hartford division of The Connecticut Company made a graphic demonstration of the time that it lost in making change on trolley cars.

Mr. Bristol had as his guests, on a trial trip of a safety car, a number of newspaper men and other citizens of Hartford. He supplied each man with a half dollar and also with 6 cents in change. There were eleven passengers on the trip and Mr. Bristol asked each one to present the half dollar to the operator when he boarded the car. A stop watch was held by one of the men and, although the operator worked very rapidly, it took one minute and thirteen seconds for him to collect the fares, make change, register the fares and get under way. At another stop Mr. Bristol asked the passengers to present the six cents in change to the operator. This they did and the fares were collected and the car under way in twenty-one and two-fifths seconds.

The demonstration might be called part of a campaign being conducted by The Connecticut Company to educate the public to have the exact fare ready. It gave all those who were on the trial trip a vivid conception of the time that may be saved if passengers will have their fares ready instead of presenting coins or bills that take the operator's time in making change.

# Why More Income Must Be Secured

### Hearing Before Committee on Public Utilities of National Chamber of Commerce in St. Louis Brings Out Needs of Electric Railways for Adequate Revenues and Needs of Communities for Adequate Railways

THE meeting of the United States Chamber of Commerce on April 30, as briefly noted in the ELECTRIC RAILWAY JOURNAL of May 3 in connection with the general account of last week's convention in St. Louis, took the form of "hearing" by the committee on public utilities. Lewis E. Pierson, Irving National Bank, New York, chairman of the committee, presided during the first part of the meeting and Paul M. Myers, president St. Paul Association of Commerce, during the latter part. Evidence in regard to the utility situation was presented, usually in the form of answers to questions put by or through the chairman.

J. B. Chilberg, president Scandinavian-American Bank of Seattle and a member of the Seattle Chamber of Commerce, was the first speaker. Mr. Chilberg said that the franchise in Seattle prescribed a franchise tax of 2 per cent of the gross earnings in addition to the regular taxes; a fare of 5 cents, including transfers, and the sale of twenty-five tickets without transfer privilege for $1. With the outbreak of the war there was a tremendous expansion in the shipbuilding business at Seattle, and large numbers of workmen had to be carried twice a day to and from the shipyards. In the meantime the operating expense of the company increased greatly. With the war the 4-cent fare was abolished, but under a State law the company was not allowed to charge more than 5 cents although the city was willing to grant a 6-cent fare.

As it would have required several years to repeal this law, Mr. Chilberg stated, municipal purchase seemed to be the only alternative. This was carried out, most business men supporting the purchase plan although none was in favor of municipal ownership except as the last resort. For the purchase price of $15,000,000 the city issued bonds which were a first lien on the gross receipts of the combined old and new city lines.

In reviewing the steps taken by the city since the purchase of the property, Mr. Chilberg said that the Council had passed an ordinance stopping jitney competition and was planning to put in skip stops. It had also cut off free transportation for policemen and firemen. Of course, under municipal ownership the 2 per cent franchise payment and the taxes would be lost to the city. The traction company had formerly paved about one-third of the surface of the streets through which its tracks ran, but Mr. Chilberg did not know whether the cost of this paving would be assessed in the future against the tramway department or not. With these changes T. F. Murphine, superintendent of public utilities, hoped to be able to carry passengers for 5 cents. The old municipal railway in Seattle, Mr. Chilberg said, had not been a financial success. So far as he knew, no plan has been made for keeping the accounts of the whole system so as to show the comparative expense of operation under city management and private management, or the taxes and other city payments which would now be forfeited. Such a plan would have to be initiated by the city, if undertaken, because the Public Utility Commission in Washington does not have jurisdiction over municipal properties.

The testimony of Harlow C. Clark, of the American Electric Railway Association staff, the next speaker, is published on the next three pages of this issue.

W. O. Clure of Minneapolis who described himself as a writer of newspaper articles, said that he had been interested for many years in studying the local electric railway situation. He referred particularly to the activity of the Citizens' Council, which was doing its best to reach a common basis of understanding between the company and the city. He thought that the social aspect of the problem was more important than its economic aspect. He believed in private ownership and was in favor of a cost-of-service franchise with the abolition of all charges not directly connected with the rendering of the service.

The next speaker was Ralph S. Bauer, Lynn, Mass., who spoke in favor of low fares, the deficit to be made up by general taxation. In his opinion, high fares discourage travel, whether they are on the straight-fare or zone basis. The experience with high fares in Boston indicates that there will be a passenger loss of about 72,000,000 during the year. Low fares from the outlying districts are a boon to the merchants of any city, and they can well afford to pay the additional amount required in taxes to subsidize such a service. When asked whether employees in manufacturing plants would not require employers to raise their wages in the case of higher fares and so distribute the burden, Mr. Bauer did not think that this would occur. He considered the jitney an economic waste. He believed that a service-at-cost plan will not permit a company to give the maximum service which is desirable from a car-riding standpoint, and thus would hamper community development. High fares, he said, would force many workers to live in the industrial district and thus produce undesirable living conditions.

R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, said that this property before the war was prosperous, but expenses have increased so greatly that the company cannot earn interest on its bonds. The War Labor Board granted a yearly increase of $760,000 or 40 per cent in the company's payroll, but the municipal authorities have resisted an increase in fare. The fuel administrator has raised the price of coal and the railroad administrator has raised the charges on freight, but neither the state commissioners nor the municipal authorities have taken these prices into consideration.

Walter A. Draper, vice-president Cincinnati Traction Company, then described the cost-of-service franchise in force in Cincinnati. The Manufacturers' Association of that city was of assistance in securing the franchise, and the company now has a fare of 6 cents. In answer to the inquiry asked of a previous witness as to whether employees would not ask their employers to stand the additional transportation charges, he said that one manufacturer had told him that his employees had asked for a 10-cent increase a day in wages to pay the 2-cent increase in car fare.

A. L. Faber, Westinghouse Electric & Manufacturing Company, testified to the merits of the one-man car in increasing the service and reducing expenses.

Horace Lowry, president Twin City Rapid Transit Company, Minneapolis, spoke against an extra charge for a transfer on the ground that it created a discrimination between the man who lived on a main line and one who lived on a branch line.

At the close of the session Mr. Pierson explained that it was the hope of the committee to conduct or initiate somewhat similar hearings in other cities to find some solution of the traction problem and invited suggestions in the way of those whose testimony would be helpful and of questions to be asked. The meeting then adjourned.

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# The Railway Situation

## Survey of National Situation Indicates Imperative Need of Aid for Electric Railways

AT THE HEARING on April 30 before the committee on public utilities of the United States Chamber of Commerce, a general survey of the electric railway situation was given by Harlow C. Clark, of the American Electric Railway Association Staff. This survey follows in part, in the form of Mr. Clark's answers to queries:

*Is the electric street railway industry as a whole at the present time in a prosperous or unprosperous condition?*

In an unprosperous condition. A statement prepared by the statistical bureau of the American Electric Railway Association shows that of the 44,800 miles of single track of electric railways in the United States there were in the hands of receivers on April 29 5897 miles, or more than 13 per cent. It is also a matter of common knowledge that a large mileage which is not actually in the hands of receivers is practically in an insolvent condition. Since Jan. 1, 1915, service has been abandoned upon 240 miles of track and 528.87 miles have been dismantled and sold as junk. Thus 769.12 miles are no longer in service.

In the case of seventy-six companies whose common stock is listed, the value of this based on present capitalization and the market price of January, 1914, was at that time $496,238,398. The value on the same capitalization and the prices of January, 1919, was $245,741,642, a shrinkage of $250,496,756 or more than one-half. The shrinkage in the value of the securities of the largest New York City electric railway as between January, 1917, and February, 1919, was $126,811,100, in a total of $423,505,000.

The preliminary report of the United States Census Bureau covering statistics of electric railways for 1907, 1912 and 1917 shows that between 1917 and 1907 the income from all sources increased 69.9 per cent and the operating expenses increased 80.1 per cent, while between 1917 and 1912 the income from all sources rose 24.6 per cent and the operating expenses 36.87 per cent. Hence, in the last five years covered by the report, operating expenses increased at a greater rate than did income from all sources. This should be contrasted with the figures for the previous five years—1907 to 1912—when income from all sources increased 36.3 per cent and operating expenses 32.5 per cent, as well as the figures between 1902 and 1907, which show an increase of 71 per cent in income and 76 per cent in operating expenses.

The net income from 1907 to 1917 increased 39.9 per cent, but between 1912 and 1917 there was an actual decrease of 17.2 per cent, as compared to an increase of 68.9 per cent for the five years 1907 to 1912. This decrease in net income is perhaps more fully illustrated by a comparison based on the net income per passenger carried. This was in 1907 0.0249 cent; in 1912, 0.00354 cent, and in 1917, 0.00263 cent.

The income statement of 283 companies for 1917 and 1918, compiled by the American Electric Railway Association, shows a net income of $10,561,902 for 1916 as compared with $39,490,008 in 1917, or a decrease of 73.25 per cent. Unfortunately, it is impossible to reduce this to the revenue passenger basis, but on the basis of total passengers carried, it shows 0.0034 cent for 1917 and 0.0008 cent for 1918. It is also, unfortunately, impossible from the figures available to show all the amounts per revenue car-mile expended for maintenance. It may safely be stated, however, that since the present era of high prices the maintenance of electric railways in the United States has been cut down below what would in normal times be considered a proper standard, and that if these charges had been included, there would have been an even greater decrease in net.

Few, if any, of the companies operating in this country are charging to operating expense sufficient allowance for depreciation. In general, therefore, the census figures, as well as any income statement that may be obtained, may be said to be a distortion of the actual situation, in that a more favorable aspect is presented than is in reality warranted.

In regard to the traction situation in the 273 cities of the United States having a population of 25,000 or more, in all but twenty-nine applications for an increase in fares necessitated by the financial condition of the companies have been made. In the twenty-nine cases where no applications have been made, local and particular reasons have been the causes.

*What, in your opinion, are the principal causes of the present unprosperous condition?*

The fundamental cause is the decrease in the purchasing power of the dollar. Accepting the statement of Prof. Irving Fisher of Yale University that the purchasing power of the dollar declined 50 per cent between 1896 and 1918, and the further statement of William H. Taft and Frank P. Walsh, joint-chairmen of the National War Labor Board, which they based upon information furnished by government departments, that as between 1915 and 1918 the purchasing power of the nickel had declined so that a seven-cent fare now purchases no more than did a five-cent fare in 1915, it is easy enough to account for the condition of the industry. If the unit of fare was to-day 10 cents instead of 5 cents, the traction system would be able to meet the greatly increased costs of material, wages, taxes and money.

The cost of operation has undoubtedly advanced to a very notable degree. Between 1914 and 1918 the principal materials used by electric railways advanced from 50 to 200 per cent. A statement recently presented in the zone-system report of the Public Service Railway to the Board of Public Utility Commissioners of New Jersey shows on a weighted average an estimated increase of 82.30 per cent in the cost of materials between 1917 and 1918, while the decrease between 1918 and 1919 amounts to 2.25 per cent.

It is more difficult to give an average for the increase in wages. It may safely be said, however, that since the National War Labor Board became active the increase in wages has amounted to about 50 per cent.

In addition to these causes there is a very important reason contained in the demands of the communities for increased and improved facilities and in the constantly mounting requirements for taxes and other imposts. The amount paid by 130 companies for direct taxes increased from $7,706,343 in 1912 to $9,721,694 in 1916, or 26 per cent. Other requirements of government total $4,093,636 in 1912 and $4,626,568 in 1916, or 1.2 per cent increase. In other words, the amount paid for taxes and other requirements was in 1912 2.36 cents per car-mile; in 1913, 2.53 cents; in 1914, 2.66 cents; in 1915, 2.53 cents, and in 1916, 2.48 cents.

The gradual extension of the transfer privilege has also had considerable effect upon the industry. Census figures show that while the revenue passengers increased 18.4 per cent between 1912 and 1917, the transfer passengers increased 24.6 per cent, whereas as between 1912 and 1907 the revenue passengers increased 28.23 per cent and the transfer passengers 21.25 per cent.

The great increase in the use of automobiles has also had a very marked effect. In the city of Schenectady, which has about 100,000 population, J. P. Barnes, general manager Schenectady Railway, recently made a study of the effect of automobile traffic upon street-car riding. This covers the years 1912 to 1918 inclusive and shows that in 1912 the ratio of pleasure-car riders to trolley-car riders was 1 to 20, while in 1918 it was 1 to 5.08. No doubt these figures would, in general, apply to the cities of the entire country. Aside from the use of pleasure automobiles, the use of the unregulated jitney is another principal reason for the condition of many electric railways.

*Has the rapid development of the art of electric traction made necessary frequent and large replacements and betterments in response to public demand and the orders of regulatory bodies?*

Undoubtedly. The cars, track, overhead equipment, power houses and practically everything used in connection with electric railways have very materially improved and have become materially more expensive. A very large part of this improvement has brought absolutely no increase in the way of revenue to the companies. The paving required —both as to character and to material—is an example of the kind of expenditure which has been forced upon the companies by municipal requirements but which has brought no corresponding increase in revenue. Moreover, improvements in ventilation, lighting and heating of cars have been made in response to public demand without commensurate increase in revenue. Many extensions to outlying districts have been of material benefit to property and the city as a whole, but have not been paying propositions.

*Can you state the comparative operating ratios for a series of years?*

For 1902, 57.5 per cent; for 1907, 60.1 per cent; for 1912, 58.7 per cent; for 1917, 63.76 per cent (census figures); for 1916, 62.51 per cent; for 1917, 66.65 per cent; for 1918, 72.65 per cent (American Electric Railway Association figures).

*Should traction companies be required to pay part of the cost of bridges over which their lines pass?*

This is a fundamental question and one not to be finally answered until a lasting basis for the relations between the companies and the communities is fixed. My personal opinion is that the furnishing of public service, such as electric railway service, should be done upon a cost basis and that it should be done by private capital and private enterprise because of increased efficiency thus secured, and that private enterprise should be allowed a fair and reasonable return, including a reward for economy and efficiency. This return, which must be sufficient to attract new capital into the business, is a necessary part of the cost of service. Having arrived at this conclusion, we must look at every charge against electric railway operation as a charge against the car rider and not as a deduction from the profits of the corporation controlling the company. I do not believe that a public utility should be used as a means of profit-making for a community or for the reduction of taxes or of the cost of city government.

The problem is one of the proper division of city expense as between users of car service and the tax payers. If we accept the theory of service at cost, then we must agree that every charge placed upon the service is paid from the fare received from the passenger. Under existing theories and methods the car service is being taxed to provide thoroughfares for practically every form of transportation except car service. Not only is this true as regards paving, but also as regards street cleaning, street sprinkling and snow removal. For a person who uses an automobile, a wagon, a truck, bicycle, jitney, omnibus or a taxi, the community furnishes a thoroughfare provided at public expense. For the citizen who uses the street car it not only compels him to pay for his own thoroughfare, but taxes him for the benefit of the users of other transportation.

In general, as regards bridge, paving construction and similar highway charges, those made necessary by the special nature of the transportation, namely, rails, ties and other things involved in providing the track and strengthening and improving bridges for use by cars are a proper charge against the carrier. On the other hand, there is no reason why he should be taxed for any part of the thoroughfare which is furnished to other means by transportation without charge.

The committee may be interested to note the theory of the State-appointed trustees of the Boston Elevated Railway in conneection with the use of subways by the Boston electric railway system. In their annual report the trustees say: "The trustees believe that subways are nothing more than highways under the surface, and that the public should own all its highways whether on the surface or below the surface. . . .The trustees believe that the public owes the same duty to furnish highways for electric railway travel that it does for pedestrian or other travelers. . . . The trustees have also asked that the company be reimbursed from the public treasury for the subway rentals which it has been called upon to pay."

*Is it for the public interest that traction companies which perform an indispensable public function be protected against the destructive effect of unregulated jitney competition? If so, to what extent and in what manner should regulation of jitneys be applied?*

Jitneys should be declared common carriers and treated as such. The same methods and practices of regulation should be applied to them as to the transportation systems —a certificate of convenience and necessity should be required for the operation of a jitney bus; where special licenses, imposts and taxes are levied upon an electric railway they should be similarly levied upon jitney bus lines; where rates, schedules and service of an electric railway are specified and controlled, they should be similarly specified for jitneys, and requirements as to safe and efficient operation for electric railways should be extended to jitneys.

*Assuming that the continuance of existing conditions will make most traction companies insolvent and prevent or curtail their operation, what remedy or remedies would you suggest?*

(a) Exemption from special taxes, reduction of property taxes and abolition of franchise charges?

(b) Exemption from special charges for bridge construction?

(c) Exemption from paving charges except those arising directly from the existence of operation of the tracks?

It seems to me that communities and the companies must get together on a basis which recognizes that the return to capital should be limited to such a rate as will attract new capital into the business, but which will assure this return on the basis of a flexible fare automatically regulated to provide the cost of the service. I believe that the communities should be permitted to prescribe the service that they require. I believe that there should be special inducement to the private operators of these companies for the exercise of economy and initiative. I believe that co-operative action as between companies and communities will alone bring about such service as will meet the requirements of the city under a reasonable rate of fare. My answers to the detailed queries are these:

(a) Yes.

(b) Exemption from special charges for bridge construction except such as arise from the necessity of increasing bridge strength.

(c) Exemption from paving charges except those arising directly from the existence or operation of the tracks. I would favor exemption from all paving charges excepting those which might arise from the tearing up or reconstruction of track necessitated by electric railway work.

*Would you favor an increase in fare and, if so, would you favor an increase for a flat rate irrespective of distance traveled or would you favor the substitution of the zone system?*

I would favor such an increase in fares as would cover the cost of providing the service. As between a flat rate system and a zone system, it seems logical that a system of charges based on a stand-by charge or readiness-to-serve charge plus a charge for distance is more equitable between individuals than a flat-rate system. However, the experience with zone or distance tariffs in this country has as yet been insufficient to demonstrate whether such a distance charge would be better for the social welfare of the community as a whole than the present flat-rate system. I think, moreover, that conditions which prevail in various communities must be taken into consideration in the determination of this question. It is apparent that in the smaller cities the zone system is unnecessary and impracticable.

*Would an increase in the flat rate tend so materially to lessen short-haul traffic as to decrease instead of increase net revenues?*

The answer to this question depends largely upon the amount of such fare increase and the particular conditions concerning the property to which it is applied. In general, I think the car fare should be considered as it affects the riding habit in terms of the average income rather than in its relation to past fares. Car fare is usually a comparatively small part of the budget of the average family. The increase in the cost of living has been met, and is being met by an increase in wages and salaries. I think it would be found true in a very great majority of cases that the proportion of the family budget spent for car fare under any rate of fare now prevailing in the United States is considerably less than it was under a 5-cent fare at the time when most of the fare stipulations were written into the present franchises. For instance, in the period before 1900, $2 was a fair average for the laboring man's wage—the 5-cent fare was then one-fortieth of his wage. To-day $4 is rather below the average wage, but on this basis it would require a 10-cent fare to absorb the same proportion of the income that a 5-cent fare did in those days. It is, therefore, apparent that any rate of fare now likely to be charged imposes no more hardship than did the nickel fare, and that if the riding habit falls off under these conditions we must seek other reasons.

I think that it may safely be said that the experience of most companies charging an increased rate of fare was that there was a temporary falling off of greater or less degree in the traffic, but that the traffic is gradually returning. There is in all cities, except those whose growth is stationary, a normal increase in riding from year to year, so that any decrease in traffic occasioned by an increase in fares would gradually be taken care of by this normal increase. If a service-at-cost system is established and the public is persuaded that it is paying the actual cost of the service and no more, many of the psychological reasons which arise to antagonize the public when a fare increase is made will be eliminated.

*Would the zone system tend materially to reduce traffic in outlying districts?*

See the above.

*Should the transfer privilege be greatly restricted or abolished as a means for increasing revenues? If so, why?*

If the cost-of-service plan be in effect, the question of the method of charging becomes largely a social question to be determined by the community.

*The general effect of traction service has been to develop suburban and interurban districts by providing means of access thereto. Real estate values have been greatly increased and large investments in homes and factory buildings have been made because of the facilities afforded by such traction service. Would not such property suffer heavy depreciation if traction service were withdrawn because of the insolvency of the companies?*

Undoubtedly.

*Can you inform us of the extent of suburban and outlying trackage, the operation of which has already been abandoned by reason of the financial difficulties of traction companies?*

See statement of abandoned lines already made. The majority of these were, of course, in suburban and outlying districts.

*Do you know of any outlying factories, the labor supply of which has been interfered with by cessation of traction facilities?*

None in particular.

*In general terms, what are your views as to the effect upon communities everywhere of such a material reduction of traction service as would necessarily result from the general insolvency of traction companies?*

It would prove disastrous to such communities. From my experience in the position of secretary of a Chamber of Commerce in a city of 150,000 people, I know how important to the commercial and industrial as well as social development of the communities is good electric railway service. The industrial development of the town—that is development of its factories—is very largely dependent upon electric railway service. Communities without such service are at a disadvantage in their competition with other communities.

*In your opinion, is such a condition of general insolvency probable unless means for the relief of the companies are provided*

(a) *By remission of charges now imposed by public authorities?*

(b) *By increasing the earnings by higher rates of fare?*

Yes.

The electric railway section of the National Safety Council, H. B. Adams, chairman, Aurora, Elgin & Chicago Railroad Company, Aurora, Ill., desires bulletins which can be distributed to members of the section. Electric railways which have had unusual success with bulletins can assist in the general safety movement by co-operating with the railway section in this way.

## How One Company Makes Sure Its Men Do Not Miss Useful Technical Articles

ONCE a year a list of fifty or seventy-five technical publications is sent around to officers and heads of departments in the Portland Railway Light & Power Company, and each man writes his name opposite those periodicals he desires to see regularly. The ruling is that any periodical called for by company officers is provided without question, while the name of more than one head of department is required to warrant the addition of a new paper to the list.

The papers come addressed to the library where an assistant librarian scans each article to see what should be referred specifically to individuals. For the guidance of this library reader there has been prepared a list of topics on which the several officials should see articles, for example:

President—fare increases, one-man cars, public relations, legal questions.

Vice-president—franchises, operating problems, improvement of equipment.

City superintendent—labor management, organization, training platform men, accounting, bonuses.

Electrical engineer—plant construction management and operation.

A paster is attached to each paper on which the name of the officials scheduled to receive that number are listed and on which the dates on which they receive the paper are listed.

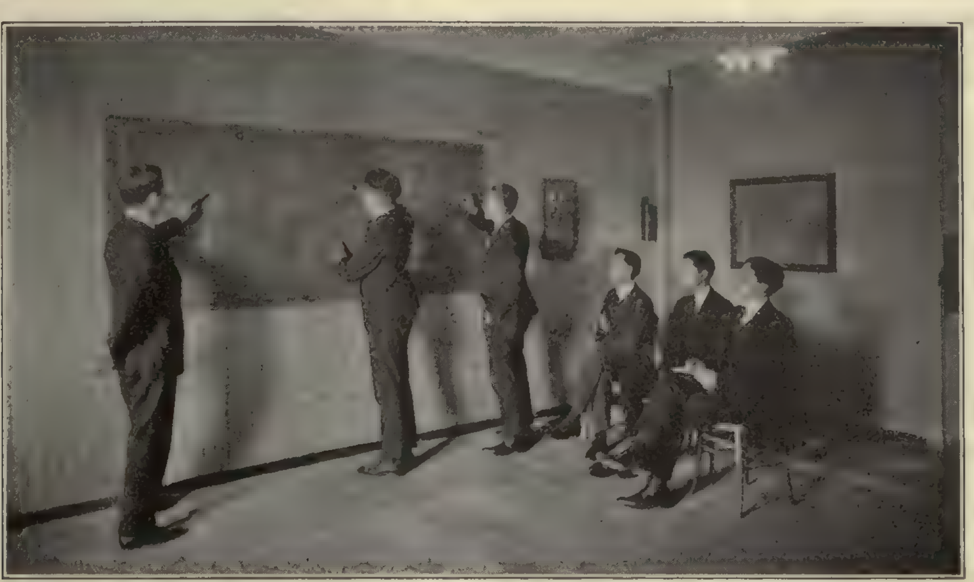
## Standard Rule for Grade Crossings Objectionable

A SUGGESTION was made recently by a manufacturer's representative in regard to grade crossings with steam railroads. It was to the effect that no blanket rule covering operation of street cars over such crossings can be made by either city or state authorities.

If the same rule is applied to the two extreme conditions of a switch track in a sparsely settled district where steam operation is infrequent and where the view in either direction is unobstructed and to a double-track main-line crossing where fast trains are frequently passing and the view is obstructed, the danger connected with each will assume somewhat of equal magnitude in the mind of the conductor who goes through the same operations at each crossing. There is a tendency for him to become careless at the switch track because of the realization that the rule is not warranted.

This carelessness is quite likely to spread until it eventually manifests itself at the main-line crossing. Of course the suggestion made applies to both two-man cars and safety cars.

In one city in the Middle West, on a 5-mile line which has been completely equipped with safety cars, there are six double-track grade crossings. During the rush hours of the steam railroad the electric railway company uses men from other departments to act as flagmen at these crossings. At other times the operator flags himself across, just as a careful automobile driver would, namely, by bringing his car to a standstill and observing the crossing in each direction, and after being satisfied that there is no danger from oncoming trains, proceeding.



DRAWING DIAGRAM ON BLACKBOARD FOR THE CRITICISM OF INSTRUCTOR

# Substation Operators Trained in Fifteen Days

### Intensive Instruction Courses Originally Conceived as a War Measure Are Now Being Continued by the Brooklyn Rapid Transit System and Prove a Great Success Under Normal Conditions

A SCHOOL for substation operators was started in the spring of 1918 by R. B. Arthur, assistant to H. A. Robbins, Superintendent of Power for the Brooklyn Rapid Transit Company. This school was first started to train operators for filling vacancies created by the demands of the war. It has met with such success, however, that it is now being continued as a permanent adjunct of the electrical department.

Before a man may become an operator he must be employed in a substation of the company as a rotary man, for in that position he becomes familiar with the general plan and operation of the substation, learns how the current comes from the central station to the substation, and how it is distributed over the wires and cables to the elevated, surface and subway lines. Previous to the establishment of the school the training of operators was left to the various substation foremen. In some cases this plan gave good results, yet while a foreman may have been an excellent operator it did not always follow that he had the ability to instruct green men in the operation of substations. Before a man was certified as an operator he would be placed under several foremen so as to get as much information as possible. If reports on the progress of the man were satisfactory, and if he was found to be competent, he was made an operator.

Naturally this method of instruction was slow, and when men began to leave the substations in rather large numbers to enter military service and war industries, it was found necessary to change the method of instruction. As a result a class of six rotary men was started, and they received instruction in a course lasting six days. At the end of this time three men were qualified as operators and two others were qualified a week

TIMING ROTARY CONVERTERS FOR "CUTTING IN" ON THE LINE

STUDENTS TESTING HIGH TENSION FEEDERS UNDER SUPERVISION OF THE INSTRUCTOR later. The first few classes demonstrated the value of such a course of training, and this substation school for operators has now been made permanent.

The course as at present arranged for green men lasts about fifteen days. After the operators have been qualified, in order to maintain a high standard of efficiency they are occasionally recalled to the school for further instruction. The courses for operators recalled to the school are naturally much shorter and deal with specific phases for operating. The hours for the school are from 8 o'clock in the morning until 4 o'clock in the afternoon, for five days a week. The men are chosen for the school according to their seniority, provided they have served at least two months as rotary men and have had previous experience in the electrical line.

### THERE ARE THREE PHASES OF THE INSTRUCTION PERIOD

The instruction course for green men is divided into three periods. The first of these provides instruction in the general plan and operation of all substations on the system. They are taught how electric power is generated, how the generating station furnishes the alternating current to the high-tension bus and how the power is handled at the substation. The path that the current takes after leaving the high-tension bus is explained, and the operation of each piece of apparatus is amplified by diagrams put on a blackboard, and showing the exact connections of the apparatus. The students take notes and copy all diagrams. Each piece of apparatus is explained in detail.

During the second period of instruction the student is required to explain just what to do if some piece of station equipment becomes defective and how to remedy the trouble and get the machine in operation. All the station circuits, both alternating current and direct current, are gone over very carefully, and each one in turn is explained. The class is then taken to a substation and taught how to synchronize or bring the rotary into "step" with the generator at the generating station. In order to guard against closing of the switch at the wrong time when the rotary is out of phase or "step" with the generator the instructor controls the main switch. If he thinks the period is a good one, he closes the main switch at the same time that the student closes his own. This prevents damage to the apparatus. Each student performs this operation until he can do it to the entire satisfaction of the instructor. He is then permitted to "cut in" the rotary on the line. By using this method it is found that the men become more confident, and only twice since the school was started have machines been "cut in" by the students while out of phase.

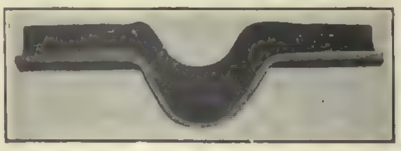
After the entire class is able to "cut in" and "cut out" a rotary the apparatus is tied up in every possible way. Fuses are removed in the control circuit, burnt lamps are inserted in the synchronizing circuit, the field wires are disconnected from the rotary, the oil switches are blocked out and the jaws of the starting switch on the induction motor opened to avoid contact. In addition to these, after the rotary has become synchronized and is ready to "cut in" on the direct-current bus, the student may find that the auxiliary apparatus has been put out of service or that the circuit breaker will not remain in. In either case it is his place to discover the reason for this and also find the remedy. Instruction is also given in how to correct local troubles that may arise, such as the handling of alternating-current and direct-current feeders and overloads and short-circuits.

By the end of the second period all the students are able to make a diagram of any piece of apparatus found in the various substations. They are then ready for the third period, which is spent in visiting different substations where the operating conditions of each station are fully explained. When students are working on any piece of apparatus it is blocked and locked out, and the key is kept by the individual working on the apparatus in question. This is done for the protection of himself and others so that the apparatus cannot possibly be made alive, which might result in injury and perhaps death to those working on it.

The last two days of the course are spent by the student in his classroom where a general review of the instruction given in three previous weeks is made, and anything that is not clear is explained. The course is brought to a close by a written examination consisting in answering some 367 questions, and preparing diagrams for the exact connections of the more important circuits.

## Double Feeder Insulators Give Strong Construction

THE six heavy wires on the upper arms of the feeder line shown in the accompanying illustration are not supported directly by the insulators, but instead are lying in saddles bridging the gaps between two adjacent insulators and are supported by them. The reason for this unusual construction is that the wires are of 2,000,000 circ.mil section and the engineer who built the line feared that the ordinary tie-top pin insulators would not be strong enough safely to carry their weight on a 90-ft. or 100-ft. span if a single insulator were used. He therefore had saddles for the feeders made of steel in the form shown in the "close up" view, and placed these between the prongs of the insulators with the U-shaped portion, in which the cable rests, located midway between the pins.



ABOVE, SADDLE USED FOR CABLE SUPPORT. AT RIGHT, FEEDER LINE WITH CABLE SUPPORTED IN SADDLES

This form of construction makes an extra strong line at little additional cost; the only increase in price being for the extra arms, insulators and saddles required, and the labor for installing them. On other portions of the same system where the spans are not as long 2,000,000-circ.mil wires have been carried on single insulators for a number of years without the slightest trouble. While the additional precautions taken in this case may not have been needed yet the double construction is undoubtedly stronger than one with only half as many insulators and therefore worth the additional expense for material and labor necessary for installation on this important line.

# Sidelights on the Zone Fare—The Problem of Currency

### Intermediate Coins Should Be Added to American Currency to Attain Flexibility as Good as England's Without Excessive Use of Tokens

By WALTER JACKSON

"AMERICANS won't bother about splitting a nickel" is an opinion frequently expressed by street railway men. Be that as it may, it is obvious from the records of many companies which have gone to 6, 7 and 8-cent fares that quite a number of Americans surely have an aversion to splitting a *dime*. Yet this phenomenon in turn has led to the rise of a comparatively small school which avers that American riders would rather pay a dime than be bothered with the making of change! If any noteworthy number of these higher-fare travelers are murmuring to the conductor: "Keep the change," this theory stands vindicated.

Most of us are agreed that the convenience of having a single-coin passport outweighed much of the inequity of the old 5-cent universal fare as long as the purchasing power of the nickel was unimpaired. But that advantage has gone, whether we are dealing with increased universal, central district 5-cent fares, more-than-5-cent zone fares or less-than-5-cent zone fares. Therefore, we must not blame the zone fare because the amount of change-making and number of car-hours for a given traffic may have to be increased. Every operator will have to face the problem of securing the kind of currency most convenient for his patrons. If he cannot get it from Uncle Sam he will have to make it.

Fortunately, the situation is not so bad as it might have been had the electric railways been the first to go to odd prices. The department store with its 99-cent and $1.98 bargains went only a comparatively small way in popularizing the cent. In fact, up to the great increases following the outbreak of war in 1914, the nickel still was the pre-eminent coin, not merely for the street care ride but also for the loaf of bread, the packet of chewing gum, many articles in the "5 and 10-cent" store, etc. It is true that some merchants have met the rise in costs by giving a smaller package or quantity for the old unit price, but in a great number of cases the selling price has been raised to some figure like 6, 7 and 8 cents. This has resulted in ceaseless calls upon the government for more copper and still more copper. With the arrival of fare increases, it is necessary to secure 1-cent pieces by the ton and to supply each conductor with special means to hold them! Alas! for the good old days when Pacific Coast conductors had so noble a scorn for copper that they would rather permit Easterners to ride free than soil their hands with man's primal metal.

A news item just to hand also states that since the new consumption taxes went into effect this month, the Philadelphia and Denver mints are making 2,000,000 cent-pieces a day. From the foregoing sketchy but truthful résumé of changes in the proportion of 5-cent and 1-cent pieces, it is apparent that since copper is more plentiful it is easier to split the nickel now than it was three or four years ago. For the street railway man, also, there has arisen this most distressing situation—the average man feels that his income has not increased so rapidly as the purchasing power of money has decreased, and he is therefore watching his pennies as he never did before.

Let us get next to Mr. Common Citizen to realize how careful he has become about the purchase of a thing that he can dispense with in whole or in part—and that thing is the ride on the street car. Where he once used the car as a convenience, he must now be convinced that he ought to use it for economy in shoe leather and time. How are we going to convince him to return with still greater patronage unless we do what is always done in every other line of selling—give the customer as small a package as he wants or can afford to buy!

Just for a parallel: How many of us are aware that more people in this world buy their fowl by the quarter than by the entire bird? A trip to the East Side of New York or to the East End of London will reward anyone who wants to see the principle of meeting the customer's wishes carried to the limit.

Why is it that the better-paid American workingman or clerk will not ride for such distances as the Britisher unless it be that we have not been applying to him this first principle of salesmanship?

To be sure, there are many American towns and cities where the density of population is so low and the degree of individual prosperity so high that a fare below 5 cents would not increase the traffic sufficiently to make up for the loss of 5-cent short riders. In such places, frequent service with light one-man cars will probably scoop up almost everything worth while. If, after the installation of these cars, the proportion of riders within the 1 or 1½-mile radius is still low, it will prove worth while to do some figuring. There's Aberdeen, for example, with 25 per cent of the passengers riding less than 0.6 mile. Can any of our steepest or warmest cities match this record of a city where climate and national characteristics favor walking?

What has this to do with the splitting of the nickel for short rides? Just this: That such splitting, and consequently short-ride cultivation, has already been made easier by the large increase in 1-cent pieces. The public, however, would be still more willing to take advantage of short-ride fares, and the conductors would be more willing to handle such fares, if our coinage system were improved by adding some intermediate coin like a 2½-cent piece to get a better coin grading like 2½, 5, 7½, 10, etc. A good share of the success of the British system is due to the greater supply of copper half-pence and pence, the abundance of which cancels much of the awkwardness of British coinage considered as a whole. The difference in steps is much less than in United States money, as will be apparent from the following tables of coins and ratios up to 50 cents (United States) and 2 sh. (48 cents) United Kingdom. In each case the lowest coin is the basis of both ratios:

United States:

| Coins | 1 Cent | 5 Cents | 10 Cents | 25 Cents | 50 Cents |
|---|---|---|---|---|---|
| Ratios | 1 | 5 | 10 | 25 | 50 |

Great Britain:

| Coins | Farthing | Half-Penny | Penny | 3d. | 6d. | Shilling | 2s. |
|---|---|---|---|---|---|---|---|
| | *½c* | *1c* | *2c* | *6c* | *12c* | *24c* | *48c* |
| Ratios | 1 | 2 | 4 | 12 | 24 | 48 | 96 |

The foregoing tabulation shows why British coinage is better adapted for operating a zone system successfully. The penny is the fare paid by about one-half of the riders, and it is exceptionally prominent, although it was not over-abundant during the war years. This last statement is backed by the fact that London banks now are glad to carry off copper at their own expense whereas they formerly expected the depositor to pay for carriage. The half-penny has been pushed into the background by the rise in costs and the farthing has become almost as mythical as our mil.

American electric railways know of course that paper tickets and metal tokens are permissible substitutes for real money. However, substitutes have usually been employed only for special rates such as four-for-25-cents tickets, and not as direct replacements of standard coins. It would be most desirable to have a single coin to represent each class of ride so that it would be easier for the greater part of the passengers to tender exact fare. More than a generation ago we had both the 2-cent and 3-cent piece, and it is hardly a decade since an unsuccessful effort was made to restore the latter. How helpful that 3-cent piece would be now, either for a short-rate ride or for an increment to the 5-cent fare for extra-length riders! However, a 2½-cent piece would be more logical in our decimal system, as the half-nickel would bear the same relation to the nickel as the latter (once called a "half-dime") does to the dime. Eventually this coin rather than the cent would be our base.

Let us at least agitate for a system of coinage that will show greater flexibility, not alone on systems with graduated fares but on those where the service-at-cost principle keeps the universal rate see-sawing with the income statement. At the worst, we could follow the example of one of the larger British tramways which, finding farthings too scarce for its purpose in encouraging short rides in small towns, successfully sold full-rate farthing strip tickets through the conductors. By the time the war had taken its toll in higher costs, the farthing increments to the base fare of 1 penny were gently displaced by the half-penny increment without any injury to the riding habit.

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# Sources of Economy in Automatic Substation Control

### A Resumé of the Savings in Labor and Material and the Increase in Reliability Made Possible by this New Development

BY CHARLES F. LLOYD

Manager Substation Section Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE automatic substation presents such economic possibilities in railway operation that its universal use is only a question of time. Its economic value is appreciated in a general way, yet a clear statement of some of its qualities and limitations, with a practical calculation of economies that can be realized by operating railway substations automatically, should be of interest to both the central station and the railway company; to the one as a possibility for increasing its railway power load and to the other as a possibility for securing a better power rate, or more economical substation operation, or both.

The primary economies to be realized with automatic switching of substations are as follows:

1. Labor charges are materially curtailed, especially where two or three operating shifts are required and where a number of substations are made automatic.

2. Labor difficulties are materially reduced or eliminated. With the present-day labor unrest this is a feature to which full consideration should be given even though it may be difficult to figure the value on a monetary basis.

3. Energy saving amounts to a considerable item, especially on interurban lines where the power demand is intermittent. This saving will result from the elimination of no-load losses, since the automatic switching shuts down the substations when power is not required. This saving means, in general, a conservation of coal, the necessity for which has been brought home to us recently in a forcible manner.

4. Feeder loss can be cut down on account of the practicability of locating substations where required, without having to take labor operating cost into consideration.

5. Feeder copper can usually be reduced on existing properties by relocating substations, or increasing their number, or by both. There are, no doubt, many properties where to-day sufficient copper could be taken down to go a long way toward paying for automatic switching.

6. Electrolysis conditions are invariably improved since the proper location of substations, made possible by automatic switching, materially reduces the length of return circuits and reduces return drops.

7. Reliability of the service can be increased. Considering the ability of the best operators who can be obtained in many cases greater reliability of service is to be anticipated. At least in one case an automatic substation has shown more reliable results than a similar manually-operated one. In any event, it is safe to say that reliability will not be impaired by automatic operation.

8. Maintenance is being classed as a quality since at least in one or two actual cases its cost has run very low. Proper and intelligent inspection and cleaning of the apparatus will undoubtedly result in reduced maintenance expense.

Like all equipment automatic switching apparatus has its limitations and features that partially counterbalance the good qualities. The following are salient items in this case:

1. Inspection must be made by a competent engineer. Since experience seems to indicate that this will not be required oftener than once or twice per week, it is probable that labor saving will not have to be reduced to maintain this talent. It is also probable that the labor for cleaning up the substation apparatus every week or ten days can be obtained by using carhouse men, thereby making it necessary to charge little expense to this item.

2. Investment will probably be increased, entailing, of course, additional capital charge.

3. Hazard to the apparatus may be increased. However the indications are that automatic switching has been developed to such a degree that if properly applied, this fact may even be turned to an advantage in favor of automatic switching.

4. Complication in switching is increased over hand switching; but with proper inspection this should be immaterial since the switching is surprisingly simple.

5. Feeders require careful application to prevent annealing of dropping trolley wires.

6. High-tension lines may have to be rearranged in some cases for automatic substations since there will be no operators to transfer them in case of high-tension troubles. Since the tendency is toward simplication in high-tension switching, with much better line construction, this is not a serious feature. In cases where automatic substations may be used at high-tension switching points, it may be practicable to handle the high-tension switching by remote control.

To illustrate the economies to be realized in substation

TYPICAL ECONOMIES PRODUCED BY AUTOMATIC SUBSTATION SWITCHING

| | | |
|---|---|---|
| Headway between cars | 1 Hr. | 2 Hr. |
| Length of line, miles | 25 | 25 |
| Number of substations | 3 | 3 |
| Capacity of substations, kilowatts | 300 | 300 |
| Distance between substations, miles | 10 | 10 |
| Schedule speed, miles per hour | 25 | 20 |
| Length of operating day, hours | 20 | 60 |
| Total substation hours (manual operation) | 60 | 60 |
| Total substation hours (automatic operation) | 32 | 20 |
| Running-light loss per station, kilowatts | 15 | 15 |
| Energy saved per day (automatic operation), kilowatt-hours | 420 | 600 |
| Energy saved per year (automatic operation), kilowatt-hours | 153,300 | 219,000 |
| Value of energy saving at 1 cent per kilowatt-hour | $1,533 | $2,190 |
| Labor-saving per year, six operators at $70 per month | $5,040 | $5,040 |
| Total saving per year | $6,673 | $7,230 |
| Total investment automatic control—three stations | $18,000 | $18,000 |
| Interest, insurance, maintenance, depreciation, taxes, at 15 per cent | $2,700 | $2,700 |
| Cost of inspection per year | $500 | $500 |
| Total annual charges | $3,200 | $3,200 |
| Net annual saving | $3,373 | $4,030 |
| Return on investment, per cent | 18.7 | 22.4 |

operation by automatic control, the table above shows a typical case where the principal features producing savings have been only considered. This tabulation shows what may be considered an average condition and it would not be surprising to find that much greater savings can be effected in the majority of cases, especially when all features are taken into thorough consideration.

## Drilling Fender Slats With an Electric Drill Saves Time

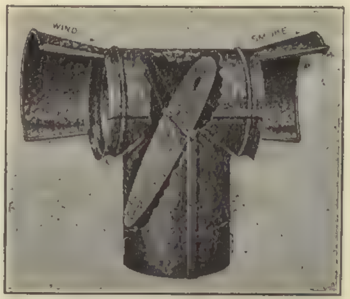
SEVERE operating conditions keep car fender work very active in the shops of the Winnipeg Electric Railway. The accompanying illustration shows an electric drill mounted on a bench in a convenient location for drilling fender slats. This drill was formerly used in some other branch of the service. A jig to insure that the holes are drilled in their proper location facilitates rapid operation. This bench is located alongside the place where the fender repairs are made and its convenience has resulted in nearly five times the amount of work being accomplished in the same time as was previously done when this work was performed by hand.

DRILLING FENDER SLATS AT THE SHOPS OF THE WINNIPEG ELECTRIC RAILWAY

According to results secured in experiments at the University of Illinois 1/32 in. of scale in boiler tubes may reduce efficiency by 9 per cent, while 1/9 in. may reduce it 16 per cent.

## A Flue Top for Cars

THE simple ventilator flue top for coal heaters, illustrated herewith, is being used on some of the cars of the Cincinnati Traction Company. It is made by William G. Fischer of that city and is designed to exhaust the smoke, gases and other products of combustion generated in stoves carried on moving vehicles, especially where soft coal is used. The flue pipe consists of horizontal and vertical sections, the horizontal section being transverse to the length of the car. The open ends of the horizontal section then face the side-quarters of the wind. Inside the vertical section is an oscillating tongue or diaphragm which leads the smoke into both outlets under normal conditions but will swing to void the smoke through the opening away from the wind if the wind pressure is much higher on one side than on the other. Each orifice is provided with semi-circular wings with their convex surfaces disposed forward to avoid back draft.



SECTIONAL VIEW OF FLUE TOP

## New Type of Hand-Operated Punch

A NEW TYPE of hand punch has recently been placed on the market by Paul W. Koch & Company, Chicago, Ill. It is called the "Jiffy" punch and punches holes of $\frac{5}{32}$ in., $\frac{3}{16}$ in., $\frac{7}{32}$ in. and $\frac{1}{4}$ in. in metal up to a thickness of No. 10 gage. The particular feature of the machine is a deep throat and one-piece automatic disappearing stripper which gives a clear view to the punch and punch marks for the next operation. This also permits several sheets to be punched with one operation. The punch is shown in an accompanying illustration. It weighs 5 pounds, is $9\frac{1}{2}$ in. long and may be clamped in a vise if desired. One-half turn of the top handle operates the punch and drives it through the metal.

NEW TYPE OF HAND-OPERATED PUNCH

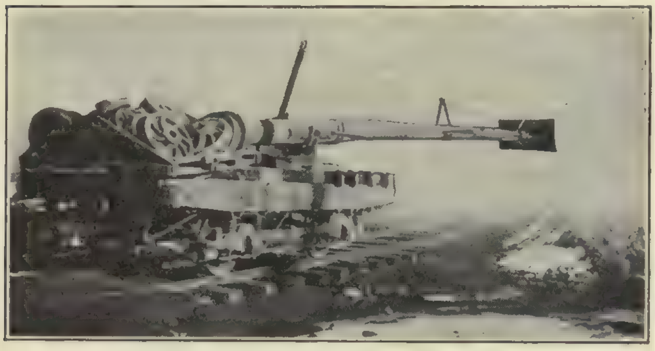
## Electrification Shows Surprising Results on an English Railroad

Three years before the electrification of the London & Southwestern Railroad's suburban lines 25,000,000 passengers were carried. Due to the inadequacy of the steam service rendered this number fell off to 23,000,000 just preceding electrification. In 1916 electric service was gradually brought into operation and the number of passengers carried increased to 29,000,000. In 1917 this number further increased to 33,000,000 and in 1918 the total was 40,000,000.

## A Mechanical Pusher for Unloading Flat Cars

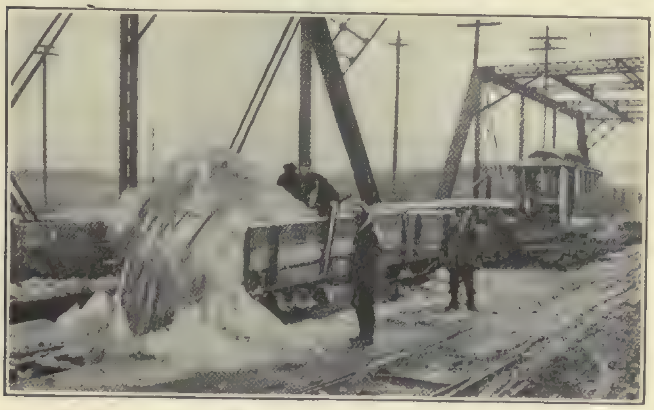
By W. L. Whitlock
Office Engineer The Denver Tramway Company

THE "pusher" shown in the accompanying photos was constructed by the Denver Tramway Company for the purpose of reducing the labor costs of unloading flat cars with dirt in addition to reducing the length of time that the equipment was tied up on this class of work. The dirt excavations of track, bridge and building jobs whenever possible are loaded onto our standard flat cars, and in former years this material was used to backfill a gravel pit that this company leased. At the present time a dump has been established at which waste materials are disposed.



"PUSHER" ON TURNOUT

The "pusher" is mounted on a Bemis single truck having a wheelbase of approximately 7 ft. A platform was built over this truck and a wood pole 55 ft. long with a steel plate placed on the end of pole, was mounted on a pivot over the truck and three steel rods, with turnbuckles in the center to adjust strains were provided for reinforcing the pole. Counterbalance is provided by means of a platform weighted with scrap steel on the rear end of the pole. A coupler is provided on the rear end of the pusher to permit of coupling to a work car equipment.



AN ECONOMICAL DUMPING OPERATION

It is necessary to have the dump track provided with a turnout in order to use this equipment to advantage. The "pusher" stands on the turnout track when not in use. A motor car with a flat car loaded with dirt backs onto the dump track and the brakeman sets up the handbrake on the flat car, removes the brake staff and "cuts off" the motor car. This then backs up, couples onto the "pusher" and runs up to the flat car. The train crew drop the side boards of the flat car and then unload it by means of the "pusher." The brakeman takes his stand at the head of the "pusher" pole and guides the pole as to depth and side swing and the motor car provides the power. A crew of two men will unload a car of dirt in approximately fifteen minutes.

During a very heavy fall of snow a few years ago, it was necessary to remove snow in certain locations by flat cars, and the "pusher" unloaded these cars into the Platte River through an opening in the bridge as shown in an accompanying photograph. By the use of the "pusher" three men were able to perform the work which otherwise would have required a work gang of fifteen shovelers. Flat cars each holding from 12 to 14 cu.yd. of snow were unloaded at an average rate of six minutes per car. This home-made pusher running day and night, at a cost of $9 per shift for labor, was able to unload more snow than was handled off flat cars by the city at Sixth Avenue with a cost of more than $80 per shift.

## New Soot Cleaner Swivel Head

THE Vulcan Soot Cleaner Company, Du Bois, Pa, has just placed on the market a new swivel head for its soot cleaner. Steam from the boiler passes into the swivel head from the bottom through a vertical pipe and thence into the horizontal element which extends from the swivel head through the brick wall and into the setting.

After the steam is turned on the operator rotates the element slowly from one extreme to the other. Steam turbine nozzles inserted in the element discharge the steam between the tubes in high velocity jets, and in the course of rotation the tubes are freed from soot. The limitations of rotation are regulated by stops attached to the link chain. A pointer from one arm of the sprocket indicates to the operator the direction in which the steam jets are discharging.

To take care of expansion and contraction a gastight, sliding joint is provided between the sprocket wheel and the metal housing that is mortared into the brickwork. As the vertical riser expands or contracts, the swivel head moves up or down and the attached end of the element follows.

## Leaks Through Subway Walls Stopped

THE leaks in the Canal Street station of the Broadway Subway, New York, operated by the Brooklyn Rapid Transit Company, which perplexed engineers for many months, have been finally stopped. When the situation was at its worst several months ago, water poured into the station at the rate of 150 gal. a minute. Under the direction of engineers of the Public Service Commission for the First District, a system was devised by which these leaks have been very largely stopped; so that now the total flow of water is less than 2 gal a minute, and it is expected that shortly it will be stopped altogether. The system employed in ending the leaks consists of drilling holes through the concrete side walls of the subway at various points, and through these forcing grout—a mixture of cement and water—until no more can be pumped through the openings. By this means the leaks, which were in reality breaks at the connection of waterproofing laps on the outside of the structure, were effectually stopped.

# American Association News

VALUATION COMMITTEE OF AMERICAN ASSOCIATION AND EQUIPMENT COMMITTEE OF ENGINEERING ASSOCIATION BEGIN ACTIVITIES—NEWS OF COMPANY SECTION MEETINGS

## Changes in Washington Office

W. V. HILL has tendered his resignation as manager of the Washington office of the American Association and has returned to California to resume his work as manager of the California Electric Railway Association. Mr. Hill performed invaluable service in Washington for the Electric Railway War Board and later for the committee on national relations, and his resignation was accepted with regret.

The committee on national relations has placed A. S. Hills temporarily in charge of the Washington office as acting manager. Mr. Hills is the executive secretary of the National Public Utilities Committee.

## Valuation Committee Begins Work

THE valuation committee of the American Association held its first meeting of the year in New York on May 6. The members in attendance were J. N. Shannahan, Hampton, Va.; C. E. Bailey, New York, N. Y.; Martin Schreiber, Newark, N. J.; George Weston, Philadelphia, Pa., and B. E. Tilton, Syracuse, N. Y.; J. H. Pardee, E. B. Burritt and J. W. Welsh were also present. Owing to P. J. Kealy, chairman, being unavoidably detained in Kansas City, Mr. Shannahan was chosen to preside.

The discussion covered the general work of the committee and the program to be followed. Mr. Weston was requested to formulate a statement of cardinal principles of valuation and submit it to the other committee members in advance of the next meeting. It was proposed that these members should then reduce to writing their opinions in regard to this statement, all the material to be presented at the next meeting for discussion.

## Epuipment Committee Meeting Well Attended

THE equipment committee of the Engineering Association met in New York City on April 30. The three subjects which had been assigned the commitee for study and report were considered, and subcommittees were appointed to collect information and make recommendations on each. These were listed in the ELECTRIC RAILWAY JOURNAL of March 22, page 609. The following were present: Daniel Durie, Connellsville, Pa., chairman; W. S. Adams, Philadelphia, Pa.; R. H. Dalgleish, Washington, D. C.; E. D. Priest, Schenectady, N. Y.; K. A. Simmon, Pittsburgh, Pa., and N. D. Trist, Pittsburgh, Pa.

In regard to coöperation with the National Fire Protection Association in formulating a new code for 1200-volt car wiring, the committee considered that it was very important to have representation. The wiring problem and conditions for electric car equipment differ considerably from other forms of electric installation, and as the latest practice is to install the wiring in conduits wherever possible any increase in thickness of the insulation on the various wires would mean the use of large conduits and heavier construction. All felt that the outside diameter of the wires should be kept as small as would be consistent with the necessary safety protection. The subcommittee appointed to have charge of this subject consisted of W. G. Gove, chairman; J. M. Bosenbury, E. D. Priest and K. A. Simmon.

In the discussion on the development of check gages and templates for wheels and truck parts it was pointed out that the present "standard" wheel is used scarcely at all. It was also felt that the adoption of gages for wheels would properly follow the adoption of a standard wheel which would be used more generally. It was also considered advisable that any standards adopted should be for wrought steel wheels and should not apply to cast iron wheels. The subcommittee to work on this subject comprises H. A. Johnson, chairman; W. S. Adams, R. H. Dalgleish, W. G. Gove, E. W. Lyndon and N. D. Trist.

The topic, "Standardization of Motor Parts," brought out discussion as to the extent to which standardization may prevent progress. The operating members of the committee mentioned the great number of spare motor parts which they find it necessary to carry, many of which differ very slightly. Any standardization would of course be of great assistance in reducing the number of these parts. The manufacturing engineers described the large amount of standardization work that had been going on in their individual companies and said that it was to their advantage as well as the purchasers' to keep the number of parts small. This would reduce the number of dies, tools, etc., which are required. Some of the items which might be standardized are the supports of field coils, field coil terminals, lengths of leads, types of motor lead connectors and style of bushing for leads. Perhaps a recommendation for the use in new designs of only the nose type of motor suspension and box-frame motors might be favored. The subcommittee appointed to consider this subject and make recommendations consists of R. H. Dalgleish, chairman; J. M. Bosenbury, Daniel Durie, E. D. Priest and K. A. Simmon.

The sub-committees were instructed to hold meetings as soon and as frequently as possible, and the next general meeting of the committee was scheduled for June 26 and 27.

## Lively Meeting at Bridgeport, Conn.

THE April meeting of the Connecticut Company section was held under the auspices of the Bridgeport division, J. S. Goodwin manager, at the Hotel Stratfield on Apr. 29. Two hundred or more dined together and after dinner a program, largely of entertainment, was carried out. The membership committee reported additions of fifty-one during the month bringing the total membership to 330. W. E. Jones, statistician, and J. F. Berry, attorney, were presented with gifts in appreciation of their services to the section. Mr. Jones has joined the auditing department of the Rhode Island Company, and Mr. Berry is taking up the practice of law in Hartford.

Mr. Berry, who has conducted the higher fare and legislative relief cases for the company, explained what had been done in showing the legislature why the company needed relief, but the action taken on the day of the meeting showed that little impression had been made. As long as the cars keep moving, said he, the people will continue to believe that the railways will get along somehow. J. K. Punderford, general manager, followed in the same general strain and urged an even greater co-operation on the part of the organization. Lieut. Devine, a local lawyer, gave a dramatic tale of the soldier's life at the front, closing with a plea for the Victory Loan.

The entertainment comprised orchestral and vocal music, recitation of original verses by "Motorman 4449," solo dancing and "black-face comedy."

## Important Mail Hearings

THE Interstate Commerce Commission has arranged for an important series of regional hearings during June and July in regard to the compensation of electric railways for the transportation of United States mail. It is highly essential that all companies should take advantage of this opportunity to present their case in order that adequate conpensation may be secured, for under changes in legislation made in 1918 it is provided that:

> It shall be unlawful for any urban or interurban electric railroad to refuse to perform mail service at the rates or methods of compensation thus provided for such service when required by the Postmaster General so to do, and for such offense it shall be fined $100. Each day of refusal shall constitute a separate offense.

The American Electric Railway Association, in order that the electric railways may be able properly to present their case, is arranging for the designation of different electric railway men to supervise and co-ordinate the work in connection with the regional hearings. There will be one of these railway leaders for each hearing. The hearings are to be held before Examiner George N. Brown at 10 a.m. on the dates and at the places here noted:

| | | |
|---|---|---|
| June 9, 1919 | Office of Interstate Commerce Com. | Washington, D. C. |
| June 11, 1919 | United States Court Rooms | Philadelphia, Pa. |
| June 13, 1919 | United States Court Rooms | Boston, Mass. |
| June 18, 1919 | Hotel Onondaga | Syracuse, N. Y. |
| June 20, 1919 | United States Court Rooms | Cleveland, Ohio |
| June 23, 1919 | United States Court Rooms | Detroit, Mich. |
| June 25, 1919 | United States Court Rooms | Indianapolis, Ind. |
| June 27, 1919 | Federal Building | Chicago, Ill. |
| June 30, 1919 | United States Court Rooms | Minneapolis, Minn. |
| July 3, 1919 | United States Court Rooms | Portland, Ore. |
| July 7, 1919 | Hotel St. Francis | San Francisco, Cal. |
| July 9, 1919 | United States Court Rooms | Los Angeles, Cal. |
| July 15, 1919 | United States Court Rooms | Salt Lake City, Utah |
| July 18, 1919 | Federal Building | Kansas City, Mo. |
| July 22, 1919 | United States Court Rooms | Dallas, Tex. |
| July 24, 1919 | Hotel Jefferson | St. Louis, Mo. |
| July 26, 1919 | Hotel Gibson | Cincinnati, Ohio |
| July 28, 1919 | Rooms of Chamber of Commerce | Pittsburgh, Pa. |

The association has also thoroughly canvassed the situation and has prepared under the direction of F. W. Doolittle, consulting engineer, a form of exhibit for the use of the companies in order that data may be presented upon a uniform basis. The subject matter of the exhibit is divided into two general parts relating to the transportation of pouch mail and to the transportation of mail in independent cars. Data on both subjects are necessary to the Interstate Commerce Commission in determining a general theory of rates for electric railway transportation of mail and in calculating specific rates applicable to the companies engaged in this business.

## Utility Commission Inspector Addresses Newark Section

ON APRIL 25 H. C. Eddy, senior inspector Public Utility Commission of New Jersey, read a paper on "The Development of the Electric Railway" before the Public Service Railway company section at Newark, N. J. This was illustrated by means of a large collection of lantern slides from various sources which the speaker had assembled for the purpose. He traced the evolution of the modern car body, track, overhead, and power system using illustrations relating to the local property as far as possible. As the speaker based his talk largely on personal experience gained in the electric railway business in different parts of the world he was able to give a touch of reality to the narration. In his audience were many men who had taken an active part in the development of the local system, their experience extending over many years, and this furnished a strong bond between the audience and the speaker. The audience included a public utility commissioner, the chief engineer of the commission, officials of the railway company and 150 or more employees.

The membership committee reported seventy-four accessions since April 1 and the secretary read a letter from E. B. Burritt reminding the section that the competition for the medal to be awarded by the American Association for the best paper presented before a company section will close on May 31.

## Mississippi Association Reconvenes

H. E. BRANDLI, vice-president and general manager Meridian Light & Railway Company, was elected president of the Mississippi Electrical Association at a meeting held in Gulfport, Miss., on April 15, 16 and 17. E. S. Myers, general manager Vicksburg Light & Traction Company, was elected secretary.

Owing to war conditions this was the first convention held by the State association during the last four years. The meeting was an enthusiastic one from start to finish and was well attended. One of the interesting social features of the program was a boat trip from Biloxi, Miss., around the bay.

In the absence of W. T. Stewart, president Mississippi Coast Traction Company, Gulfport, Miss., Barney E. Eaton, attorney for the Gulf & Ship Island Railroad, an allied interest, gave the welcoming address. Mr. Eaton called attention to the handicap suffered by the utilities during the war period, owing to inability to get satisfactory rates from the communities served.

In the course of his president's address H. F. Wheeler, general manager Hattiesburg Traction Company, said:

> While we call ourselves an electric association, we are most of us vitally interested just at this time as to the future of our associated electric railway properties. The case of the small electric railway is infinitely worse than that of the other utilities. The privately-owned automobile first came and made heavy inroads on its revenue. Then the jitney came and took its share, but nothing like the privately-owned machine. The last straw was the war, which doubled the cost of all commodities except utility service and particularly the 5-cent car fare.
>
> In the light of present conditions we are almost tempted

to believe that the small electric railway was a mistake from the beginning and that there never was an excuse for building one in a small community. Some may differ with me in this statement and ask what about residences, schools or hospitals a mile or more from town. The answer is that these would doubtless have been built much nearer town had there been no street-car system, or if there were no street-car system they would doubtless be served by their own bus or by some company operating a bus line. It is easy to look back and see mistakes, and as we now look back it is difficult to understand why a small system was ever built.

Of course we understand the old argument that a street-car system helps to build up a town. The operating expense and fixed charges, however, have to be paid by some-one while the town is growing to the system, and it is now getting to the point where these are fast bankrupting the small electric railway. If this is associated with an electric light proposition, it is almost sure to drag the whole company into a receivership unless some drastic action is taken. The small company is not a real necessity but rather a convenience or luxury, and if the fares are placed at a high enough figure to permit the utility to exist, the number of passengers will fall sufficiently to more than offset any increases.

I am not here to propose any radical step, but only to repeat what we have found out for ourselves about the electric railway game. If we follow the policy of least resistance we will hang to our respective railways until our present equipment falls to pieces, with the hope that either gasoline will go to such a point that the use of the auto will be restricted, or that some new type of car may be developed which will save the day.

## Toledo Section Appoints Permanent Secretary

ON ACCOUNT of the present large membership of more than 1300 in the Toledo joint company section, it has been found necessary to appoint a permanent secretary to look after the details of the work. David H. Shapiro, formerly private secretary to Frank R. Coates, has been selected for this purpose. Mr. Shapiro reports that a very successful get-together meeting was held on April 28, with 600 members in attendance. The program comprised vaudeville "stunts," instrumental music, community singing, monolog, and boxing and wrestling matches.

# LETTERS TO THE EDITORS

## How Travel in Large Cities Increases

80 WALL STREET
NEW YORK CITY, April 29, 1919.

To the Editors:

On page 839 of your April 26 issue, there is published an estimate by Public Service Commissioner Kracke on the probable population and traffic of New York City in 1950. While it is within the limits of probability that the population of Greater New York will reach 12,500,000 persons in 1950, it is utterly impossible that this population should produce over 8,000,000,000 passengers on the city transportation lines. This would mean nearly 700 rides per capita per annum, which, as can be readily shown, is an absurdly high figure.

It is an established fact that during a certain period of a city's growth the traffic increases more rapidly than the population. This is due to the increase of the riding habit, conveniently expressed as rides per capita per annum. The riding habit, however, has a definite limit, and the increase in rides per capita becomes smaller and smaller as this limit is approached. After the riding habit has reached its limit, the traffic will grow only in the proportion of the population growth.

Only about 40 per cent of the people in a large city are habitual riders and most of these ride only twice a day. The other 60 per cent, children, housewives and those workers who walk to their places of employment, ride only occasionally. No matter how large the city and how extensive the transportation facilities, this part of the population will not ride more than four times per week per person. If this traffic and also that derived from non-residents are prorated to the habitual riders, it becomes evident that no higher figure than 3½ rides per day should be assigned to them. On the basis of 300 business days, therefore, one thousand rides per year per habitual rider or 400 rides per capita of the whole population appears to be the limit of the riding habit.

It may be concluded that even should greater New York become a metropolis with 12,500,000 population the traffic on the city transportation lines would not be over 5 billion passengers.

EUGENE E. HALMOS.

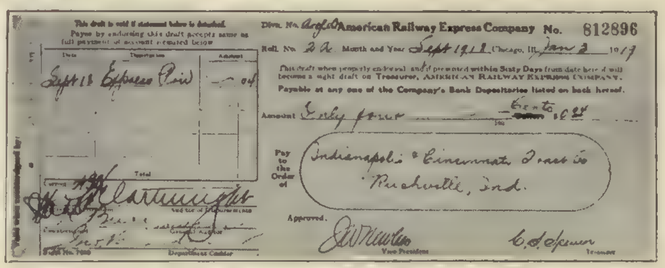
## All the Railway Got During One Month Was 4 Cents

INDIANAPOLIS & CINCINNATI TRACTION COMPANY

INDIANAPOLIS, IND., May 6, 1919.

To the Editors:

On July 1, 1918, the American Railway Express Company took over the privilege of the Adams Express Company for operating over our lines, for which we were receiving 40 per cent of the gross receipts for the transportation of express. The results of the operation of the American Railway Express Company are so striking that I think attention should be called to them. Below, in tabulated form, is a comparison of amounts paid to this company by each of the two companies:


This draft is void if statement below is detached.
Payee by endorsing this draft accepts same as full payment of account itemized below

| Date | Description | Amount |
|---|---|---|
| Sept 18 | Express Paid | .04 |
| | Total | |

Div. No. American Railway Express Company No. 812896
Roll No. 2A Month and Year Sept 1918 Chicago, Ill., Jan 3 1919
This draft when properly endorsed and if presented within Sixty Days from date hereof will become a sight draft on Treasurer, AMERICAN RAILWAY EXPRESS COMPANY.
Payable at any one of the Company's Bank Depositories listed on back hereof.
Amount Only four Cents $0.04
Pay to the Order of Indianapolis & Cincinnati Tract Co Rushville, Ind.
Approved.
Vice President
Treasurer
Department Cashier

REPRODUCTION OF THE CHECK FOR SEPTEMBER, 1918

| For same privilege Adams Express Company paid for: | |
|---|---|
| January, 1918 | $320.00 |
| February, 1918 | 288.61 |
| March, 1918 | 430.14 |
| April, 1918 | 439.01 |
| May, 1918 | 456.72 |
| Total for 5 months | $1,934.48 |

| While the American Railway Express Company paid the following: | |
|---|---|
| July, 1918 | $58.26 |
| August. 1918 | 130.47 |
| September, 1918 | .04 |
| October. 1918 | 18.78 |
| November, 1918 | 3.12 |
| December, 1918 | 65.13 |
| Total for 6 months | $275.80 |

I also inclose a photograph of the draft sent us for 4 cents for our 40 per cent of the business for the month of September, 1918.

This surely is a good illustration of the benefits of government control.

CHARLES L. HENRY, President.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Transit Work Almost Completed

### New York City's $300,000,000 Municipally-Owned, but Privately-Managed, System Ready

The opening recently of the new Clark Street tunnel between Manhattan and Brooklyn leaves few important parts of the dual rapid transit system for New York City yet to be placed in operation. There are still three more East River tunnels to be completed and placed in service, but they are parts of the system operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit System).

### MORE RIVER TUNNELS SOON

The first to be opened will be the Whitehall Street-Montague Street tunnel, which will connect the Fourth Avenue subway system in Brooklyn with the new Broadway subway in Manhattan. Another is the tunnel from Sixtieth Street, Manhattan, to Long Island City in Queens, which will connect the northern part of the Broadway subway in Manhattan with the existing elevated railroads to Astoria and Corona in Queens, over which the New York Consolidated Company will have joint trackage rights with the Interborough Rapid Transit Company. The third is the tunnel from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn, a part of the Fourteenth Street-Eastern line which begins at Sixth Avenue, Manhattan, runs under Fourteenth Street to the East River, under the river to North Seventh Street, Brooklyn, under North Seventh Street to Metropolitan Avenue, to Johnson Avenue, to Bushwick Avenue, and thence by elevated railroad to East New York.

It will be another year or more before all these lines will be completed, but it is hoped that the Whitehall-Montague Street tunnel will be placed in operation early in the coming Summer. Another line for this system yet to be built is the projected subway extension from the Municipal Building, under Nassau Street to a junction with the Montague Street tunnel line at Hanover Square. The contracts for this subway have not yet been awarded.

### INTERBOROUGH SYSTEM NEARLY FINISHED

With the exception of one short subway line in Manhattan, one elevated extension and one subway extension in the Bronx, storage yards in Brooklyn, the Bronx and Queens, and the extension of the Brooklyn subway from Atlantic Avenue, out Eastern Parkway to Buffalo Avenue, and its branch down Nostrand Avenue to Flatbush Avenue, and the elevated extension from Buffalo Avenue over East Ninety-eighth Street and Livonia Avenue to New Lots Road, the Interborough part of the dual system is completed.

The subway line in Manhattan just referred to is the extension of the Queensborough subway or Steinway tunnel line westward under Forty-second Street from the Grand Central to Times Square. The elevated extension in the Bronx is the extension of the Third Avenue Elevated Railroad out Webster Avenue to a junction with the White Plains Road branch of the subway at Gun Hill Road, and the subway extension is the elevated part of the Pelham Bay Park branch. All of this work is being built and will be owned by the city of New York with the exception of the Webster Avenue elevated extension, which is to be built and paid for by the Interborough Rapid Transit Company.

## Strike on Canadian Line

A strike of the employees of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., controlled by the Detroit (Mich.) United Railway, stopped all traffic on the lines of the company at 5 a. m., on May 3. Attempts at conciliation between the men and the company have so far proved unsuccessful.

The men demand the dismissal of F. E. Hayes, general superintendent of lines, the recognition of the union, an eight-hour day with a minimum wage of 50 cents an hour and a maximum of 65 cents an hour. The present wage scale is 36 cents minimum and 41 cents maximum. The strikers have expressed willingness to compromise on all points except the removal of Mr. Hayes.

Mr. Anderson, manager of the company, stated that the officials of the company had no proposals to make, and contended that an increase in wages could not be granted to the employees unless an increase in fares was allowed by the five border cities in which the railway operates.

No arrangements have been made for continued service and the suggestion that the lines be taken over temporarily by the Ontario Hydro-Electric Commission was rejected by the company's officials.

The action of the men is sanctioned by the Amalgamated Association. The Detroit men are asking practically the same scale of wages.

As a result of the strike business and manufacturing concerns in Windsor and the neighboring municipalities are seriously hampered. There is little traffic on the Detroit-Windsor ferry.

## New York Commission Reorganized

### Lewis Nixon Appointed Regulatory Head of Commission for Greater New York

Lewis Nixon, appointed by Governor Smith as the regulatory head of the Public Service Commission for the First District of New York, was designated by the Governor on May 3 to supervise the construction end of the subway work until the appointment of a public service commissioner in charge of construction work. Under the changes made in the commission law at the session of the Legislature ended recently, the commission with jurisdiction covering Greater New York will be organized with two members, one in charge of regulation and the other in charge of construction.

Commissioners Whitney, Hervey and Kracke, who have been serving, completed their work on May 3. Two names for appointment to the post of commissioner in charge of construction are suggested as probabilities. One is that of Col. Merritt Smith, who was chief engineer of the Bureau of Water Supply, Gas and Electricity of the City of New York, and the other is that of Henry B. Seaman, formerly chief engineer of the commission.

### PLANS OF RETIRING COMMISSIONERS

Travis H. Whitney, acting chairman of the commission, has announced that he will resume the practice of law. Mr. Whitney has been connected with the commission since it was created, at first as its secretary and for the last two years as a commissioner.

Commissioner Kracke will enter no business field that would restrict his political activities.

Commissioner Hervey has entered the moving picture field.

Mr. Nixon refused to say anything definite in regard to his plans until after he had formally taken over the work of the commissionership and acquainted himself with his surroundings. He did, however, make the following general statement:

> The Governor told me that he wanted a man for the place who knew the value of money, as well as its comparative value with time in certain emergencies, and who had the knack of getting a dollar's worth for every dollar spent. Well, I believe I am that kind of a man. I shall serve the public to the best of my ability, not with the hope of pleasing all, for that is impossible, but surely with the expectation of giving all that I have to the work.
>
> Whatever decided opinions I may have, they must be and shall be subordinated to the statutes. I enter upon the office almost a stranger to its specific duties. I must have time to study conditions before I venture opinions upon this or that phase of a situation. This will require much time. Meantime I can do only one thing—enforce the law as I find it.

## Wages in Seattle

### Municipal Railway Makes Public Rates for Various Positions from Superintendent Down

The scale of wages for trainmen heretofore in effect on the short existing municipal line in the city of Seattle, Wash., will increase the monthly payroll on the present enlarged municipal line by $17,894. The city scale is considerably higher than the scale paid by the Puget Sound Traction, Light & Power Company, the railway lines of which were taken over recently by the city. The wage schedule covering all the executive positions and many of those of the rank and file follows:

| | Per Year |
|---|---|
| Superintendent, unclassified | $4,500 |
| | Per Month |
| Assistant superintendent | $300 |
| Secretary-stenographer | 150 |
| Railway construction inspector | 145 |
| Service and equipment inspector | 145 |
| Subway inspector | 135 |
| Pole inspector | 135 |
| Gas franchise inspector | 135 |
| Junior utility inspector | 130 |
| Junior draftsman | 135 |

**Clerical Division**

| | |
|---|---|
| Head clerk | $150 |
| Stenographers (6) | 120 |
| Lost article clerk | [illegible] |

**Accounting Division**

| | |
|---|---|
| Auditor | $260 |
| Assistant auditor | 185 |
| Bookkeepers (2) | 150 |
| Revenue clerk | 180 |
| Cashier | 165 |
| Assistant cashiers (11) | 100 |
| General storekeeper | 175 |
| Assistant storekeeper | 150 |
| Head clerk | 150 |

**Transportation Division**

| | |
|---|---|
| Superintendent of transportation | $300 |
| Assistant superintendent of transportation | 200 |
| Station masters (4) | 170 |
| First assistant station masters (4) | 155 |
| Second assistant station master (1) | 100 |
| Superintendent of schedules | 200 |
| Assistant superintendent of schedules | 150 |
| Mileage clerks (2) | 80 |
| Inspectors (15) | 170 |
| Starters (3) | 150 |
| Instructors (3) | 170 |
| Superintendent of freight | 175 |
| Chief dispatcher | 190 |
| Dispatchers (5) | 150 |
| Telephone engineer | 175 |
| | Per Day |
| Trainmen (cable gripmen) | $4.65<br>4.90<br>5.15 |
| Trainmen (freight and passenger) | 4.25<br>4.50<br>4.75 |
| Trainmen (one-man car operators) | 4.57<br>4.82<br>5.07 |
| Oilers (16) | 4.25<br>4.50<br>4.75 |

**Ways and Structures Division**

| | Per Month |
|---|---|
| Chief engineer | $300 |
| Assistant engineer | 240 |
| Chief draftsman | 160 |
| Railway draftsmen (2) | 135 |
| Roadmaster | 200 |
| Clerk | 120<br>145 |
| Bridge tender | 140 |

**Shops and Carhouses Division**

| | |
|---|---|
| Superintendent of equipment | $333 |
| Assistant superintendent of equipment | 200 |
| Chief clerk | 150 |
| Clerks (3) | 120<br>145 |
| Junior clerk (1) | 80<br>115 |
| General shop foreman | 250 |
| Shop foremen (3) | 175 |
| | Per Month |
| General carhouse foreman | $200 |
| Carhouse foremen (12) | 140<br>175 |

**Intelligence Division**

| | Per Month |
|---|---|
| Supervisor, publicity and contracts | $200 |
| Supervisor, personnel | 200 |
| Assistant supervisor, personnel (4) | 150 |
| Supervisor, power | 180 |
| First assistant supervisor, power | 175 |
| Second assistant supervisor, power | 150 |
| Statistician | 175 |
| Complaints clerk | 170 |
| Equipment and ways and structures inspector | 175 |
| Service inspector | 160 |
| Assistant service inspector | 150 |

The pay of trainmen is to commence at the minimum rates noted previously and increase to the next higher rate after six months' service at any specified rate. Due allowance is to be made for continuous service with any electric railway company, the property of which shall be acquired by the city. Such continuous service, however, is to be immediately prior to the acquisition of the railway property by the city of Seattle.

## Short Strike in Wheeling

The entire Wheeling district of West Virginia, as well as a number of communities in eastern Ohio from Steubenville to Bellaire, was affected for a day by a strike of about 1200 employees of the electric railway companies operating there.

The strike went into effect at midnight on April 30 and was declared off at midnight on May 1, when an agreement was reached to arbitrate the differences. The men returned to work on May 2. The old agreement between companies and their employees expired on April 30. No attempt was made to operate cars during the strike. The companies affected were the Wheeling Traction Company, Pan Handle Traction Company, Steubenville & Wheeling Traction Company, West Virginia Traction & Electric Company, Steubenville, Wellsburg & Weirton Railway and the City Railway.

The strike was the climax to numerous conferences between representatives of the companies during which agreement was reached on nearly every section of the contract except that covering wages. The employees demanded an increase in wages of about 33 per cent over the old scale.

At a meeting of the employees on April 28 it was finally decided that in the event no agreement could be reached with representatives of the companies the employees would agree to arbitration. Difficulties then arose as to what ground should be covered by any tribunal of arbitration and as to just what extent the whole question of wages should be or could be considered. Through the absence of railway officials from Wheeling no conference was held between representatives of the conflicting interests on April 29 and this led to further misunderstanding, as a result of which employees balloted on the question of declaring a strike.

Following the issuance of the strike order the companies affected gave out a statement reviewing the entire situation, including what transpired at the conference looking toward a peaceful settlement of the matter.

## Against the One-Man Car

### President Mahon Sees in It Merely a Device for Making One Man Do Work of Two

W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, has contributed to the *Motorman and Conductor*, the official organ of the association, an article "The One-Man Car Proposition." He says that in listening to the arguments of the representatives of the railway companies on the one-man car "one would think that all the geniuses of the world had been combined to produce in the one-man car a blessing for humanity, while the truth is that the one-man car is about as old as the street railway business itself."

After further reviewing the history of cars Mr. Mahon launches into presenting his case against the one-man vehicle. While telling what a terrible maker of accidents he thinks the one-man car will prove he offers real proof of what a really frightful increase there has actually been under operation with cars on which two men are used. But let Mr. Mahon convict himself with his own pen. Here in part is what he says:

> This is a case where the public have forgotten the one-man car and the fight they had to displace it. They are now trying to put this old, discarded and outlawed proposition over you again. They are gilding it a little with gold and stripes and giving it the appearance of something new.
>
> Now, let us analyze the one-man car proposition honestly. If you can find one benefit in it in favor of the riding or traveling public I will concede without further argument that they should have the one-man car.
>
> There is but one proposition that brings forth the one-man car, and that is the question of finance to the company. It means that one man shall do the work of two in the operation of a car. Does it mean any better treatment to the public? Does it mean more safety to the man who uses the streets? Does it mean more safety to the employee? Does it mean less labor to the operator? Does it mean more safety to the men, women and children that ride upon the cars or that occupy or use the streets? Can you show one single argument that will produce anything of that kind? You know you cannot, and every advocate of the proposition knows he cannot.
>
> What do they claim? They claim that they will run the cars faster. What will that do? Will that lessen the danger to the riding public or to the users of the streets? Oh, but he says, the car will be so equipped with but one door for passengers to get in and out; that the door will be locked and no one can get out until the motorman stops the car and opens the door. Does that mean safety to the public? Is that in line with the motto we see painted on the cars, in the barns, on the telegraph poles—"Safety First"? This motorman with his passengers locked in must cross the steam railroad tracks and other crossings without anyone to warn or signal him. What does it mean if a railroad train bears down upon this car with these passengers all locked in and no way to escape? Stop a moment and think what this means to these people. Suppose this motorman should faint or meet with death while his car is in operation. So you see by the use of this car you are increasing the danger and to add to the speed of it means a greater danger with absolutely no escape or protection provided for. Not only is it a danger to the riding public but to every user of the streets. This motorman will have all the additional burdens of answering the questions of the passengers, making change and doing the other man's work placed upon him, and then, with increased speed you can readily see what you are confronted with.

Mr. Mahon then quotes from the census of the United States government. He says that the census figures show that the electric railways killed one passenger out of every 18,015,894 persons carried in 1902 and in the same year killed one employee out of every 1154 in service. In 1907 the railways killed one person out of every 13,603,500 passengers carried and one employee out of 746 employees in service, an increase in five years of more than 106 per cent in number of passengers killed and more than 143 per cent of employees. In 1902 the expense for damages to the electric railways of the United States was $9,395,545. In 1907 it was $18,176,305, or an increase of more than 93 per cent. Mr. Mahon says that the 1912 census is silent for some unknown reason on this subject. In conclusion he says:

> But we are satisfied from what we know that the death rate is greater to-day than it was in 1907. If these figures say anything to you, they say that as a commission or a council having the welfare of the citizens of your municipality to protect, you cannot afford to pass any ordinance allowing the use of the one-man car, which means to increase the danger to the life and limb of every citizen of your municipality.

## Wages Up for Settlement in East St. Louis

Although the working agreement of motormen and conductors employed by the East St. Louis & Suburban Railway and the Alton, Granite City & St. Louis Traction Company, East St. Louis, Ill., has expired, terms for the 1919-1920 contract have not been decided upon.

Employees of the East St. Louis & Suburban Railway are asking an eight-hour day and 80 cents an hour. The traction company's men demand eight hours and 87½ cents an hour.

Conductors and motormen on both lines were working under agreements made by the War Labor Board after they had gone on strike last year. The traction employees now receive 47 cents an hour and the East St. Louis & Suburban Railway is paying a sliding scale from 41 cents to 45 cents an hour.

The demands probably will be submitted to an arbitration committee for settlement. It has been suggested that this committee shall consist of a member named by the union, another by the companies, and a federal judge.

## Want Wages Almost Doubled

A draft of a new wage scale agreement which calls for an increase that is generally regarded as excessive is being framed by the union for submission to the Rhode Island Company, Providence, to become effective on May 31.

Under an award of the War Labor Board in October, 1918, the wages of platform men were increased to 43 cents an hour for the first three months' service, 46 cents for the following nine months, and 48 cents an hour thereafter. Under the new wage agreement, which has already received the approval of the union, the following scale is demanded: 70 cents for the first three months, 73 cents an hour for the following nine months and 75 cents thereafter.

Prior to the increase granted by the War Labor Board the schedule of wages in effect was as follows; 29 cents an hour for the first six months, 31 cents an hour for the second six months, 32 cents an hour after two years, 34 cents an hour after three years and 35 cents an hour thereafter.

The eight-hour day is demanded, with double time for overtime. Snowplow men are asking in addition to the overtime pay, 20 cents an hour and the motormen on plows 30 cents an hour, the oldest men in point of service to be given the preference for this class of work.

The agreement will soon be submitted to the receivers of the Rhode Island Company for consideration.

# News Notes

**Albany Men Will Demand More.**—The employees of the United Traction Company, Albany, N. Y., will put in a demand for an increase in wages on July 1, the present agreement with the company expiring on that date. It is said unofficially that the employees will seek more than 45 cents an hour.

**County Commissioners Reject Franchise.**—The first draft of a franchise on the Canton-Massillon road, prepared by the Northern Ohio Traction & Light Company, Akron, Ohio, was rejected by the Commissioners of Stark County on May 3 on the grounds that it failed to meet the conditions laid down by the county.

**Kansas City Viaduct Will Go.**—The question of demolishing the old intercity viaduct from Kansas City, Mo., into Kansas City, Kan., has been settled by the City Council granting the Kansas City Railways permission to raze the structure. It is expected that the elevated will be destroyed and the tracks brought to street level within the next sixty days.

**Wage Demand Submitted to Arbitration.**—Recently the employees of the Stark Electric Railway, Alliance, Ohio, made a demand for an increase in wages amounting to 10 per cent. The company offered an increase of 3 cents an hour. This was refused. The matter was referred to a board of arbitration on May 1.

**Wage Conference in St. Louis.**—The wage committee of the local Amalgamated Association at St. Louis, Mo., conferred recently with Rolla Wells, receiver of the company, in regard to the demands of the employees for an increase in pay and for an eight-hour day. The conference was held as the result of a communication addressed to the men by the receiver, declaring that the demands could not be granted at present. The men have since adopted a proposal to wait a reasonable time to permit Mr. Wells to become acquainted with the situation before pressing a settlement.

**Short Strike in Tulsa.**—The basis for a settlement of the strike of the employees of the Tulsa (Okla.) Street Railway was reached on April 22 after a four-hour conference between C. H. Bosler, president, and the employees. The right of the men to organize was recognized and their demand for more pay was granted. Service was resumed late in the afternoon of April 22.

**Wages Adjusted in London.**—The London (Ont.) Street Railway and its employees have arranged an amicable settlement of wage differences. The new scale will mean an advance of 3 cents an hour, and will give a maximum rate of 38 cents. This amount is 1 cent in advance of rates first proposed as a compromise. The men will also receive 12 cents an hour overtime. Sunday work will be classed as overtime.

**Must Live Up to Wage Contract.**—Employees of the Schuylkill Railways, Girardville, Pa., were notified recently that their application for an increase in wages had been denied by the War Labor Board, on the ground that an increase could not be granted because of a contract existing between the employees and the company. The case has been pending before the board for several months.

**Inspectors Now Want More.**—Twenty inspectors of the San Francisco (Cal.) Municipal Railway have petitioned the Board of Supervisors of the city to increase their salaries to $150 a month. The inspectors now receive $4.80 a day. It is pointed out in the request that wages of platform men have been increased 50 per cent since 1915, while the increase to the inspectors has amounted to only 17½ per cent.

**Jitney Men of Newark Organize.**—Permanent organization of the Federation of Jitneymen's Associations was completed recently at a meeting in Newark, N. J. Three representatives from each of the thirteen jitney lines in Newark, which operate more than 300 cars, attended, elected officers and took steps for the establishment of a business office and for the adoption of a constitution and by-laws.

**Canadian Border Cities Want Line.**—Unanimously indorsing the plan to take over the system of the Sandwich, Windsor & Amherstburg Railway, a subsidiary of the Detroit (Mich.) United Railway, the convention of the Councils of Canadian border cities has authorized the Ontario Hydro-Electric Commission to offer the company a price for the entire road from Tecumseh to Amherstburg, a distance of 28 miles.

**Grade Crossing Payments in Columbus.**—An arrangement has been made by which the Columbus Railway, Power & Light Company, Columbus, Ohio, will reimburse the city of Columbus in nine payments for the $59,000 which was advanced as its portion of the expense of eliminating grade crossings on West Broad Street. The first payment will be 25 per cent of the total debt and will be made on May 15. The deferred payments will bear interest at the rate of 4 per cent.

**Utilities Bills Killed.**—The bill of Assemblyman Gill allowing any city in New Jersey to acquire and operate transportation lines within the city and for 14 miles distant from the city is dead. The House committee on corporations reported the bill adversely and the Assembly concurred in the report. The bill of Senator Edwards, of Hudson County, providing for an elective Public Utility Commission has also been killed in the Senate. The bill provided that members be elected by districts for a term of six years. The salary was fixed at $7,500 for each commissioner.

**Wage Increase in Fort Wayne.**—All trainmen of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., received an increase of 1 cent an hour in wages on May 1, which brings the rate up to 40 cents an hour for men in the service six years or more, with 35 cents from the date of employment. The former maximum was 39 cents. Following is the rate of hourly wage paid the trainmen under the new scale: first year, 35 cents; second year, 36 cents; third year, 37 cents; fourth year, 38 cents; fifth year, 39 cents; sixth year, 40 cents.

**Home for Trade Organizations.**—During the week ended May 10, work was started upon a building which, it is hoped, will be occupied largely by the trade associations now located, or which will locate in the future, in New York City. The building will be near the corner of Fifth Avenue and Forty-third Street, extending through the block to Forty-fourth Street. It will be twenty stories high. An arcade with display rooms will extend through from Forty-third Street to Forty-fourth Street. The name of the structure will be the National Association Building.

**Civil Service Modified in Seattle.**—The Civil Service Commission of Seattle, Wash., has waived practically all the requirements ordinarily exacted of employees entering civil service employ, in the case of motormen and conductors on the Seattle Municipal Railway. The text as it now stands amounts to little more than a statement of experience and a medical examination, and citizenship qualification. The rigid requirements have been waived in the case of the railway men so that the personnel of the railway system may be maintained with as little change as possible.

**Developing Bridge for Railway Traffic.**—The free bridge committee of the Tenth Ward Improvement Association at St. Louis, Mo., plans to make an active campaign to have the city government of St. Louis, Mo., and the officers of East St. Louis, Ill., arrange for the construction of an interurban loop in East St. Louis, thereby paving the way for the entrance of interurban business into St. Louis, Mo., via the St. Louis bridge. The committee is actively at work on its program. Up to the present time the city of St. Louis has really done nothing in regard to finishing the upper deck of the bridge for the reception of railway tracks for local and interurban traffic. The Board of Public Works of St. Louis, however, since the program of the free bridge committee was initiated, has started the construction of a short loop in the city of St. Louis and commenced stringing trolley wires on the bridge. The board expects to have this work completed by July 1, at which time two city-owned cars will be put into operation on the bridge.

**Employees and Officers Dine.**—About a hundred persons were present at a banquet held in Parkersburg, W. Va., the latter part of April by the employees of the Monongahela Valley Traction Company, at which officials of the company were guests. The affair followed and supplemented a dinner on the day before which was attended by the following officials of the company: James O. Watson, Fairmont, chairman of the board; E. Blaine Moore, general manager; W. V. Neal, superintendent of the Clarksburg Division; H. S. Newton, manager of the Parkersburg & Marietta Division. W. M. Rogers, Fairmont, president of the State Federation of Labor, acted as toastmaster. He made an earnest appeal for harmony in the relations of the company and its employees and referred approvingly to the way the company had co-operated with its employees. Chairman Watson spoke of the three elements to be considered in the public utility business—the employee, the public and the owner. Both Mr. Watson and Mr. Moore, the general manager, went into detail as to the conditions of public utilities all over the country and emphasized the need of united effort toward conservation.

## Programs of Meetings

### National Association of Corporation Schools

The seventh annual convention of the National Association of Corporation Schools will be held in Chicago, Ill., the first week in June.

### Missouri Association of Public Utilities

The convention of the Missouri Association of Public Utilities will be held at Excelsior Springs, Mo., on June 5, 6 and 7. The association is now at work formulating its program.

### American Society of Mechanical Engineers

The spring meeting of the American Society of Mechanical Engineers will open at the Hotel Statler, Detroit, Mich., on June 16, and close on June 19. The session on the afternoon of June 17 will be on the subject of industrial relations, with several addresses by men of national reputation. This session will constitute a symposium by leading organizers on the factors dominant in the labor situation, with an interchange of views as to what must be done to assure industrial peace.

### National Highway Traffic Association

The annual meeting of the National Highway Traffic Association will be held at the Automobile Club of America New York City, on May 14. Among the papers of interest to officers of electric railways are the following:

"Development of Rural Motor Express Throughout the United States," by F. W. Fenn, secretary of the motor truck committee of the National Automobile Chamber of Commerce.

"Transportation Surveys for Rural Motor Express Routes," by J. H. Collins, member of the highways transport committee of the Council of National Defense and investigator of market surveys, United States Department of Agriculture.

"Wanted: Rural Motor Express in the State of New York," by James E. Boyle, extension professor of rural economy at Cornell University.

### American Institute of Electrical Engineers

The annual convention of the American Institute of Electrical Engineers will be held at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27.

The convention committee in conjunction with the meetings and papers committee has practically completed the program for the convention, the principal features of which may be announced as follows:

#### June 24

President's address, by C. A. Adams.

"Present-Day Practice of Transmission and Tie-Line Relay Protection," by H. R. Woodrow, D. W. Roper, O. C. Traver and P. MacGahan.

"Grounded Neutral," (a) by H. R. Woodrow, (b) William E. Richards.

#### June 25

Reports of technical committees.

Conference of committee on development, section delegates and A. I. E. E. officers, at luncheon.

Conference under auspices of committee on development, including section delegates and institute officers, open to all institute members

#### June 27

"High - Tension Single Conductor Cables for Polyphase Systems," by W. F. Clark and G. B. Shanklin.

"Electrostatic Field in Electric Power Cables," by H. W. Fisher and R. W. Atkinson.

"Commercial Problems of 220-Kv. Power Transmission," by A. E. Silver.

"The Effect of Transient Voltages on Dielectrics—II," by F. W. Peek, Jr.

On the evening of June 24 there will be an informal reception and dance.

# Financial and Corporate

## San Francisco Municipal Ownership Gains

### City-Owned Lines Turned 1917 Deficit of $103,908 Into 1918 Net Income of $107,587

The preliminary report of the Municipal Railway of San Francisco for the fiscal year ended June 30, 1918, which has just been issued, shows a marked gain in net income. Although the result of operation for the preceding year, after the inclusion of all "comparison" charges required by the charter, was a deficit of $103,908, the outcome for the fiscal year 1918 was a gain of more than twice this amount to a positive net income of $107,587 for the year.

The various comparison charges are required by the charter in order that the municipal line may be considered upon the same basis as privately-owned companies when the relative efficiency of operation is being judged. In actuality the municipal railway pays no taxes, and in some instances it pays nothing for services rendered by other departments of the municipal government. The city's "true" net income—that which it really receives—is therefore greater than the comparison net income by the amount of these charter charges. For example, in 1917 the comparison net was a deficit of $103,908, and the true net a profit of $31,084; for 1918, the comparison net a profit of $107,587, and the true net a profit of $326,306. Electric railway operators and students of transportation economics are, of course, primarily interested in the comparison figures.

### 1918 PASSENGER REVENUE JUMPED 60 PER CENT

The chief reason for the improved showing in the fiscal year ended June 30, 1918, was the fact that the passenger revenue increased to a far greater extent than the total operating expenses. Whereas the gain in passenger revenue was $893,173 or 60.8 per cent, the operating expenses increased only $592,272 or 47.7 per cent. As a result the net operating revenue in 1918 represented an increase of $305,747 or 128.6 per cent over that of the preceding year. The taxes showed a heavy increase, on account of the fact that the State franchise tax went up in direct proportion to the gross revenues, the municipal franchise tax in proportion to the passenger revenues, and the federal income tax in proportion to the net income.

Although the expenses for maintenance of way and structures showed a decrease of $1,640 or 3.2 per cent, those for maintenance of equipment rose $25,756 or 36.9 per cent. A heavy increase also came in the item of power, which rose $72,927 or 34.5 per cent, and the heaviest in that of conducting transportation, which jumped $303,318 or 50.9 per cent. The reservation for depreciation and for injuries and damages is reported at a higher figure in view of the fact that it is based on 18 per cent of the revenues.

### GROWTH SINCE 1913

The accompanying statement gives not only the income figures of the Municipal Railway of San Francisco for the latest fiscal year, but also comparative data since its opening on Dec. 28, 1912. The figures show a heavy growth both in revenues and in expenses year by year except in the fiscal year ended June 30, 1917, which was the only one to show a deficit after the inclusion of the comparison charges.

The mileage and passenger figures indicate that the big expansion of the municipal system and its business occurred during 1914-1915 and 1915-1916. Each of these fiscal years, it will be recalled, included six months of the Panama-Pacific Exposition of 1915. This fact not only explains the revenue gains in these two fiscal years, but also has a bearing upon the revenue loss in 1916-1917. In regard to this point M. M. O'Shaughnessy, city engineer of San Francisco, says:

> The poorer showing in the fiscal year 1917 was due mostly to the decrease in passenger revenue, exposition travel being over. It is, of course, readily understood that the revenue per car-mile on a system when traffic is on the increase will be much higher than when it is on the decrease even when the volume of traffic is the same, owing to the fact that with increasing density of traffic the increase of service or car mileage lags behind the increase of traffic, whereas when traffic begins to decrease the reduction of car mileage lags behind the reduction of traffic. The reduction of operating expenses per car-mile from 18.32 cents in 1915-1916 to 18.17 cents in 1916-1917 and the increase per car-hour from $1.579 in 1915-1916 to $1.6637 in 1916-1917 were due to the speeding up of the schedules following the reduction in the heavy service to the exposition grounds.

In this connection it may be pointed out that during 1917-1918, when the business increased so greatly over 1916-1917, the total passenger traffic rose 26,161,313, or 72 per cent, and the revenue passenger traffic 18,250,139, or 60 per cent, as compared to 1916-1917. The car-miles, however, increased only 1,617,821, or 30 per cent.

For the fiscal year ended June 30, 1918, the traffic showed a total larger than ever before, and the unit figures for this year and the two exposition years afford some interesting comparisons. The passenger revenues per car-mile in 1917-1918 were 34.08 cents, thus substantially exceeding those of 32.90 cents in 1914-1915 and 30.99 cents in 1915-1916. The operating expenses per car-mile increased more rapidly, however, for the figure for 1917-1918 was 20.15 cents as compared to 18.63 cents in 1914-1915 and 18.32 cents in 1915-1916. As a result the net income from operation per car-mile at 4.64 cents in 1917-1918 fell below that of 5.37 cents in 1914-1915, although it was more than that of 4.37 cents in 1915-1916.

The platform expense per car-mile varied from 9.44 cents in 1915-1916 to 10.43 cents in 1917-1918, the average for the whole period since December, 1912, being 9.50 cents. The ratio of platform expense to operating expenses has remained nearly the same for the years of greatest growth—the percentages being 50.8 per cent for 1914-1915, 51.5 per cent for 1915-1916 and 51.7 per cent for 1917-1918.

According to the car-hour figures, the passenger revenue at $3.081 and the operating expenses at $1.822 for 1917-1918 produced a gain in operating earnings of about 2 cents over 1914-1915 and about 17 cents over 1915-1916. The net income from operation per car-hour at $0.419 for 1917-1918 was less than that of $0.465 for 1914-1915, but greater than that of $0.376 for 1915-1916. The platform expense per car-hour ranged from $0.814 in 1915-1916 to $0.943 in 1917-1918.

The gross income for 1917-1918, less taxes, amounted to $355,801. Upon the $6,265,801 representing the cost of road and equipment, this return represented a rate of almost 5.7 per cent. The combined reservation for depreciation and injuries and damages was 6.13 cents per car-mile in 1917-1918 and on the average 5.75 cents for the whole period.

### LARGE DEPRECIATION ALLOWANCE

Regarding the comparison of the San Francisco system with privately-owned lines, Mr. O'Shaughnessy makes these statements:

> In comparing the operating statements of the Municipal Railway of San Francisco with privately-owned lines, it is but fair to point out that the municipal railway, in addition to maintaining its property at a very high standard, is setting aside 14 per cent of its gross operating revenue as a depreciation reserve, whereas there are few privately operated properties that carry this depreciation reserve in addition to maintaining their property at the same standard of efficiency. It is claimed by the management of many private properties that it is unnecessary to carry a depreciation reserve, all renewals and replacements being handled as maintenance charges in the same manner as repairs.
>
> The following results of six years of operation of the San Francisco municipal lines [up to Jan. 1, 1919] should be of interest:
>
> San Francisco owns about 60 miles of single track, and for this it has bonded itself for the sum of $5,500,000. This amount, however, has been reduced by the sum of $404,000 for redemptions from earnings. In addition to paying all operating expenses and maintenance charges the city has put $800,000 into new construction and created a depreciation reserve of $1,000,000, $567,000 of which is invested in other municipal bonds and the balance is in the form of cash.

## COMPARATIVE FINANCIAL AND OPERATING DATA OF SAN FRANCISCO MUNICIPAL RAILWAY FROM 1912 TO 1918

| Items | Dec. 28, 1912 to Dec. 31, 1913 | Dec. 31, 1913 to June 30, 1914 | June 30, 1914 to June 30, 1915 | June 30, 1915 to June 30, 1916 | June 30, 1916 to June 30, 1917 | June 30, 1917 to June 30, 1918 | Total to June 30, 1918 |
|---|---|---|---|---|---|---|---|
| Passenger revenues | $444,393 | (*f*) $520,371 | $1,630,778 | $1,970,477 | $1,470,193 | $2,363,365 | $8,399,579 |
| Miscellaneous revenues | 354 | 1,348 | 7,886 | 12,326 | 7,717 | 12,563 | 42,197 |
| Operating revenues | $444,747 | $521,719 | $1,638,664 | $1,982,804 | $1,477,910 | $2,375,929 | $8,441,777 |
| Ways and structures | $5,659 | $9,260 | $40,715 | $40,456 | $50,976 | $49,337 | $196,405 |
| Equipment | 10,561 | 19,440 | 64,787 | 77,743 | 69,702 | 95,459 | 337,695 |
| Power | ........ | 62,590 | 201,098 | 258,163 | 211,506 | 284,432 | 1,017,789 |
| Traffic | 81 | 90 | 307 | 218 | 293 | 338 | 1,330 |
| Conducting transportation | 182,097 | 150,740 | 564,185 | 731,508 | 596,445 | 899,764 | 3,124,741 |
| General and miscellaneous | 8,389 | 27,558 | 52,293 | 56,526 | 37,212 | 68,304 | 250,286 |
| General and miscellaneous (comparison charges) | 4,587 | 3,009 | 7,768 | 9,182 | 9,416 | 9,644 | 43,606 |
| (*a*) Depreciation | 80,054 | 93,909 | 294,959 | 352,075 | 264,727 | 425,271 | 1,510,998 |
| Operating expenses | $291,431 | $366,597 | $1,226,115 | $1,525,874 | $1,240,281 | $1,832,553 | $6,482,853 |
| Net operating revenue | $153,316 | $155,122 | $412,548 | $456,929 | $237,629 | $543,376 | $1,958,923 |
| Income from municipal bonds | 1,328 | 2,217 | 10,407 | 24,038 | 22,108 | 21,500 | 81,600 |
| Gross income | $154,645 | $157,340 | $422,956 | $480,967 | $259,737 | $564,876 | $2,040,524 |
| (*b*) Taxes—comparison charges—municipal franchise, 3 per cent on passenger revenue | $13,331 | $15,611 | $48,923 | $59,149 | $44,121 | $70,878 | $252,015 |
| (*b*) Municipal car license | 547 | 540 | 2,471 | 2,955 | 2,955 | 2,955 | 12,423 |
| (*b*) State franchise, 5¼ per cent on gross revenue | (*c*) 21,125 | 27,390 | 86,029 | 103,854 | 78,500 | 124,601 | 441,501 |
| (*b*) Federal income, 1 per cent on net income | 449 | 596 | 829 | 755 | ....... | 10,640 | 13,270 |
| Total taxes | $35,454 | $44,137 | $138,254 | $166,714 | $125,576 | $209,075 | $719,211 |
| Interest on funded debt | 73,886 | 54,383 | 202,567 | 239,486 | 238,069 | 248,214 | 1,056,607 |
| Deductions from income | $109,340 | $98,521 | $340,821 | $406,200 | $363,645 | $457,289 | $1,775,819 |
| Net profit for year | $45,304 | $59,013 | $82,135 | $74,767 | (*e*) $103,908 | $107,586 | $264,900 |
| (*d*) Add general and miscellaneous comparison charges | 4,587 | 3,009 | 7,768 | 9,182 | 9,416 | 9,644 | 43,606 |
| Comparison charges for taxes | 35,454 | 43,888 | 138,254 | 166,714 | 125,576 | 209,075 | 718,962 |
| True net profit for year | $85,345 | $105,911 | $228,157 | $250,663 | $31,084 | $326,306 | $1,027,469 |
| Per Car-Mile: | | | | | | | Average |
| Passenger revenue | $0.3419 | $0.3687 | $0.3290 | $0.3099 | $0.2765 | $0.3408 | $0.3196 |
| Operating expense | .1590 | .1911 | .1863 | .1832 | .1817 | .2015 | .1875 |
| Operating earnings | .1829 | .1776 | .1427 | .1267 | .0948 | .1397 | .1321 |
| (*b*) Taxes and charter charges | .0308 | .0332 | .0295 | .0277 | .0254 | .0315 | .0290 |
| Operating expense and taxes | .1897 | .2243 | .2158 | .2108 | .2071 | .2331 | .2166 |
| Depreciation reserve | .0615 | .0665 | .0595 | .0553 | .0498 | .0613 | .0575 |
| Operating expense and depreciation | .2240 | .2576 | .2474 | .2385 | .2315 | .2629 | .2450 |
| Operating expense, depreciation and taxes | .2513 | .2909 | .2753 | .2662 | .2569 | .2944 | .2741 |
| Net income from operation | .0906 | .0779 | .0537 | .0437 | .0196 | .0464 | .0456 |
| Platform expense | .0765 | .0839 | .0947 | .0944 | .0914 | .1043 | .0950 |
| Per Car-Hour: | | | | | | | |
| Passenger revenue | $3.4463 | $3.3924 | $2.8478 | $2.6729 | $2.5317 | $3.0813 | $2.8570 |
| Operating expense | 1.6024 | 1.7581 | 1.6125 | 1.5798 | 1.6637 | 1.8222 | 1.6763 |
| Operating earnings | 1.8439 | 1.6343 | 1.2353 | 1.0931 | .8680 | 1.2591 | 1.1808 |
| Taxes and charter charges | .3103 | .3057 | .2550 | .2386 | .2325 | .2852 | .2594 |
| Operating expense and taxes | 1.9127 | 2.0638 | 1.8675 | 1.8183 | 1.8962 | 2.1074 | 1.9357 |
| Depreciation | .6203 | .6122 | .5151 | .4776 | .4558 | .5545 | .5139 |
| Operating expense and depreciation | 2.2582 | 2.3703 | 2.1412 | 2.0573 | 2.1195 | 2.3767 | 2.1902 |
| Operating expense, depreciation and taxes | 2.5330 | 2.6760 | 2.3826 | 2.2959 | 2.3520 | 2.6618 | 2.4496 |
| Net income from operation | .9133 | .7164 | .4652 | .3769 | .1797 | .4195 | .4074 |
| Platform expense | .7710 | .7717 | .8196 | .8143 | .8366 | .9431 | .8492 |
| Totals: | | | | | | | Totals |
| Passenger revenue | $444,393 | $520,371 | $1,630,778 | $1,970,477 | $1,470,193 | $2,363,365 | $8,399,579 |
| Operating expense | 206,789 | 269,678 | 923,387 | 1,164,617 | 966,137 | 1,397,637 | 4,928,248 |
| Operating earnings | 237,958 | 250,693 | 707,390 | 805,860 | 504,055 | 965,728 | 3,471,685 |
| Taxes and charter charges | 40,041 | 46,897 | 146,022 | 175,896 | 134,992 | 218,719 | 762,569 |
| Operating expenses and taxes | 246,830 | 316,576 | 1,069,409 | 1,340,513 | 1,101,130 | 1,616,357 | 5,690,817 |
| Depreciation | 80,054 | 93,909 | 294,959 | 352,075 | 264,727 | 425,271 | 1,510,998 |
| Operating expenses and depreciation | 286,844 | 363,588 | 1,218,347 | 1,516,692 | 1,230,865 | 1,822,909 | 6,439,247 |
| Operating expenses, depreciation and taxes | 326,885 | 410,485 | 1,364,369 | 1,692,589 | 1,365,857 | 2,041,629 | 7,201,816 |
| Net income from operation | 117,507 | 109,885 | 266,408 | 277,888 | 104,335 | 321,736 | 1,197,763 |
| Platform expense | 99,498 | 118,377 | 469,328 | 600,297 | 485,851 | 723,378 | 2,496,732 |
| Passenger car-miles | 1,300,849 | 1,411,196 | 4,956,429 | 6,358,543 | 5,317,269 | 6,935,090 | 26,279,396 |
| Passenger car-hours | 129,050 | 153,394 | 572,637 | 737,213 | 580,716 | 766,997 | 2,940,007 |
| Passenger cars owned | 43 | 197 | 197 | 197 | 197 | 197 | ....... |
| Single track mileage, beginning of year | 11.94 | 16.18 | 22.62 | 43.04 | 46.63 | 46.63 | (*g*) 63.95 |
| Passengers: 5-cent fare | 8,882,996 | 10,069,725 | 32,676,932 | 39,295,667 | 29,230,644 | 46,874,775 | 167,030,739 |
| Government | ......... | 6,405 | 24,911 | 44,218 | 61,159 | 110,303 | 246,996 |
| School | 49,035 | 54,527 | 278,796 | 429,212 | 399,066 | 683,192 | 1,893,828 |
| Revenue transfers | 49,543 | 287,504 | 653,360 | 479,019 | 477,288 | 750,026 | 2,696,740 |
| Free transfers | 631,363 | 1,703,139 | 6,442,207 | 7,273,072 | 5,678,274 | 13,589,247 | 35,317,302 |
| Free | 110,240 | 100,147 | 293,659 | 365,596 | 388,292 | 388,493 | 1,646,427 |
| Total | 9,723,177 | 12,221,447 | 40,369,865 | 47,886,784 | 36,234,723 | 62,396,036 | 208,832,032 |

| Reserve Funds at End of Year | Dec. 31, 1913 | June 30, 1914 | June 30, 1915 | June 30, 1916 | June 30, 1917 | June 30, 1918 |
|---|---|---|---|---|---|---|
| Operative | ........ | $274,338 | $312,044 | $273,305 | $132,348 | $406,784 |
| Unexpended bond money | $199,569 | 1,357,174 | 500,957 | 219,262 | 107,918 | 17,942 |
| Depreciation | ........ | ........ | 435,688 | 722,608 | 840,322 | 853,603 |
| Injury insurance | ........ | 64,023 | 25,237 | 49,144 | 64,046 | 48,740 |
| Investment account | 106,100 | 124,500 | 124,500 | 200,000 | 200,000 | ........ |
| Cost of road and equipment | 1,657,251 | 2,654,538 | 5,042,331 | 5,396,706 | 5,838,791 | 6,265, |
| Funded indebtedness | 1,969,000 | 3,771,500 | 5,475,000 | 5,380,000 | 5,279,000 | 5,07 |

(*a*) This 18 per cent of "gross revenue" includes 4 per cent set aside for accident and insurance and 14 per cent set aside as a depreciation reserve fund.

(*b*) The municipal railway pays no taxes, so that these are fictitious charges shown for comparative purposes as required by the city charter.

(*c*) 4¾ per cent in 1913.

(*d*) Value of services rendered by other departments of the city government for which no payment was made by the railway.

(*e*) Apparent deficit.

(*f*) Change made from calendar year to fiscal year Jan. 1, 1914; hence accounts are shown for six months' period. The distribution of operatin approximate.

(*g*) Total single track mileage April 1, 1919, at 63.95 miles, includes 6.53 miles of joint track and operation rights.

## New Blue-Sky Law

Governor Lowden of Illinois, Secretary of State Emmerson, and banking institutions and associations throughout the State are reported to have agreed upon a new form of blue-sky law. The outstanding change in the law will be abandonment of the practice of licensing vendors of securities. The bill requires every person floating securities to file with the Secretary of State the fullest of financial statements prepared under oath. The Secretary of State is to have funds with which to finance complete investigation of all statements. The most important phase of the new bill is that it provides that a copy of all information filed with the Secretary of State as to any flotation must be mailed to any person requesting it.

# Financial News Notes

**Abandonment in Yakima.**—N. C. Richards, president of the Yakima Valley Transporation Company, North Yakima, Wash., announced recently that the company would discontinue service on the North Fourth Street line. The abandonment of this service marks the beginning of the curtailment policy that was predicted when fares were raised to 10 cents.

**Income Bond Interest Passed.**—Payment of interest on the adjustment income bonds due on May 1 has been passed by the Chicago Railways. These bonds are known generally as "adjustment 4s." The last payment of interest, amounting to $100,000, was made on May 1, 1918. The bonds were issued in 1910 at the time the traction interests acquired the lines of the Chicago Consolidated Traction Company, comprising 128 miles of track.

**To Sell Traction Stock at Auction.**—Notice is given that the Guaranty Trust Company, New York, N. Y., as trustee under the indenture of the collateral trust 4 per cent bonds of the International Traction Company, Buffalo, N. Y., will offer for sale at public auction in New York, on May 28, all of the securities pledged as collateral. The offering will be made in one lot subject to certain conditions, one of which is a deposit of $50,000 in cash or a certified check for a like amount.

**Valuation Is Suggested.**—In a letter to W. C. Culkins, Director of Street Railroads at Cincinnati, Ohio, C. M. [illegible]eslie, receiver for the Interurban Rail[illegible] & Terminal Company, suggests [illegible] valuation of the track and over[illegible]wires of the company, extending [illegible]he city terminal to Coney Island, [illegible]e by appraisers to be named by [illegible]cinnati Traction Company, the [illegible]an Railway & Terminal Company and the court. This stretch of track is sought by the Cincinnati Traction Company for purpose of extending its East End line to Coney Island.

**Another Dividend Reduction.**—The directors of the Union Street Railway, New Bedford, Mass., recently announced that the dividened rate would be reduced from 8 per cent to 6. This action was taken as a result of the large deficit in the earnings for the last quarter. Last June the company was authorized to increase its capital stock by $812,500, the proceeds to be applied principally to paying for a new power house. The company previously had $1,625,000 of stock outstanding. There is only $250,000 of outstanding funded debt. The company heretofore has been unusually successful, but increases in operating cost and jitney competition have cut into earnings materially.

**Interest Payment Authorized.**—Rolla Wells, receiver for the United Railways, St. Louis, Mo., recently asked permission in the United States District Court to make a disbursement of $42,750 as interest on an issue of $2,000,000 in bonds under a mortgage on a portion of the Broadway line, which the petition says is necessary to the United Railways. In answer to the petition, Judge Dyer ruled that Mr. Wells was authorized to pay, out of the money on hand, derived from the operation of the system, the interest on $1,900,000 par value of the bonds of the St. Louis Railroad. In presenting the petition Mr. Wells said he had enough money on hand derived from the operation of the system to pay the interest on the bonds and to continue to operate without embarrassment. The interest payment on the bonds was due on May 1.

**Small Bond Issue Approved.**—The application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for authority to issue $40,000 of bonds to raise funds for an extension through Trenton Junction and for other work has been refused by the Board of Public Utility Commissioners, but an order has been issued allowing the company to issue $14,000 of bonds. In discussing the refusal to grant the full amount the board said in its order: "It appears that the balance of the proposed issue is to be used on account of construction work which is contemplated, but which for causes not within the company's control cannot be immediately undertaken. The board withholds approval of the balance of $26,000 of the proposed issue, with leave to the company to renew its application for approval of the same."

**City Accepts Minneapolis Valuation.**—The Minneapolis (Minn.) Street Railway, controlled by the Twin City Rapid Transit Company, has received from the City Council certified notice of its acceptance of $22,553,150 as the valuation of the property of the company as of Jan. 1, 1916. The company has thirty days to act upon this. The matter will be submitted to the board of directors. To become a basis for franchise determination acceptance must be received from the company. To obtain this new figure deductions were made of $3,381,257 from the estimate of City Engineer F. W. Cappelen, which was $25,914,307. These deductions were: Depreciation, $600,000; taxes during construction, $162,000; Harriet right-of-way, $632,712; water power leases, $491,857; going concern value, $1,494,581.

**Will Resume Receivership Hearings on May 19.**—The hearing in the receivership suits against the United Railways, St. Louis, Mo., which were consolidated under the John W. Seaman suit in the United States District Court by Judge Dyer, will be resumed on May 19, according to an announcement made by Special Master Henry Lamm following a conference with the attorneys for all parties. Rolla Wells, though automatically removed as receiver in the order making the Samuel W. Adler suit an intervening one to the Seaman suit, was renamed by Judge Dyer as receiver under the consolidated suits. Judge Lamm was reappointed as special master to conduct the hearings. The attorneys taking part in the conference with Special Master Lamm were Judge Henry S. Priest, Samuel A. Mitchell, Lon O. Hocker, Charles W. Bates and Ephraim Caplan. No other matters were discussed in the conference, except the date for the hearings of the consolidated suit. Mr. Bates was appointed by Judge Dyer as counsel for the receiver in the consolidated action. The judge said he had appointed Mr. Bates after consulting Receiver Wells.

**A Wheel Within a Wheel.**—The Board of Public Utility Commissioners of New Jersey is considering the case of the Morris County Traction Company and the Morris Railroad, Morristown, which entered into a traffic agreement some time ago as a result of the traction company's inability to extend its line from Morristown to Madison because of the opposition of wealthy property owners along the route. The officials of the Morris County Traction Company organized the Morris Railroad under a steam railroad charter to build and operate over a private right-of-way bordering the Lackawanna Railroad for 2½ miles. It cost $250,000 to build this part of the line, but its construction gave the traction company a continuous line from Maplewood to the terminal at Wharton and Lake Hopatcong. Without realizing that the approval of the Board of Public Utility Commissioners was necessary, the traction company agreed to guarantee the 5 per cent bonds of the Morris Railroad and the 6 per cent stock and to retire and cancel $4,000 of the bonds annually. The liability of the traction company under this agreement was subsequently removed by the Board of Public Utility Commissioners instructing the traction company to retire the bonds but not to cancel them.

# Traffic and Transportation

## Safety Day in Baltimore

### The Message to Be Careful Is Carried Home Forcefully in Competition in Schools

At the instance of the United Railways & Electric Company, Baltimore, Md., the public, parochial and private school authorities of Baltimore made May 1 "Safety Day" and all the children in the fourth, fifth, sixth, seventh and eighth grades in every school in the city on that day wrote compositions on some phase of accident prevention.

In the lower grades the little tots wrestled with the mysteries of "don'ts" and a delightfully interesting time they had with this valuable lesson.

The schoolmaster for the occasion was "Mister Accident," a special edition of the United Railways *Trolley News*, a leaflet that is ordinarily distributed in the cars of the company. On this occasion *Trolley News* was placed in the hands of every child in the schools, and the lesson that it offered was the foundation of thought for the day's work.

After the reading of the leaflet to her class each teacher put her pupils to work on compositions. That the teachers might have all necessary aid in selecting a definite subject this list of subjects approved by the board of superintendents of the public schools was presented to each class.

Our Foe, Mr. Accident
Our Friend, Mr. Safety.
Always be Careful. (The A, B, C of Safety.)
Danger of Playing in the Streets.
Safety.
How to Get On and Off Cars Safely.
Safety at Street Crossings.
Saving Our Lives Is More Important Than Saving Time.
Do Not Put Head or Arms Out of Windows.
Where to Cross the Street.
Do Not Risk Life in Play.
Cross the Street at Crossing.
Home Is Better than the Hospital.
Look Both Ways Before Crossing the Street.
Do Not Cross Street in Front of a Moving Car.
Do Not Get On or Off a Car Until It Stops.
Do Not Play on Car Tracks.
Helping Others to Be Safe.
Carelessness Our Enemy.
Some Accidents I Have Seen (or Heard of) and How It Could Have Been Avoided.

The children of the lower grades in which composition writing is not practiced had another form of the safety lesson. After reading aloud the story of "Mister Accident," the teacher called upon her pupils to suggest "Don'ts," or things not to do in order to protect oneself from mishap.

As little "Jimmie" Jones made a suggestion, as, for instance, "don't play in car tracks," this was written on the blackboard. Then Sarah Smith's "don't get off car until it stops" was written under the other, and so on until a dozen or a score of first-class "don'ts" had been displayed before the class.

The pupils were then called to read the whole list in unison, after which individuals were asked to recite as many as they could remember without looking at the blackboard.

Then all the children copied the list on paper. It is said by the teachers that the children took the keenest interest in the exercises and there was no question that the truths were driven home.

The whole purpose of "Safety Day" was to secure the concentration of school children's minds on accident prevention, and one of "Mister Accident's" strongest points was that the lessons of "Safety Day" should abide in the mind every day.

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## Complaint Against New Castle Increase Dismissed

Increases in rates filed by the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, operating the New Castle Electric Street Railway and the New Castle & Mahonington Street Railway, in New Castle, Pa., were approved by the Public Service Commission of Pennsylvania on April 28, and complaints filed by the city of New Castle were accordingly dismissed.

James Alcorn, public service commissioner, in the opinion approving the rate increase, states that the commission will permit the company to charge the present fares until May 1, 1920, when the old rates are to be established unless the company can show that it is necessary to have the revenue realized from the increased charge. The new rates increased fares from 5 cents to 6 cents, sale of tickets in packages of eleven for 60 cents, instead of 50 cents, and school tickets to be used between 7.30 a. m. and 5.30 p. m. in packages of fifty for $1.50. In concluding his opinion in the case, Commissioner Alcorn said:

> The commission is of the opinion that the new rates will not produce more revenue than will be sufficient to provide for operating expenses, taxes, depreciation and a fair return. It appears that in previous years the respondent was doing a successful business and receiving a fair income. In 1916, for instance, the net revenue was $84,502. This shows that under normal conditions the 5-cent rate is sufficient. As the respondent asks for the increased rates because of the increased cost of operation it should if permitted to put the new rates into effect restore the old rate when the conditions become normal. The new rates cannot be considered excessive. A passenger can by purchasing a package of tickets ride for less than 5½ cents. This is not too high, under present conditions as disclosed in this case.
>
> We are of opinion that in view of the increase in operating expenses the new rates are just and reasonable, and we will permit the respondent to collect those rates until May 1, 1920, and an order will be entered dismissing the complaints and requiring the company to restore the old rate after May 1, 1920, unless it be shown that the company then requires the revenue which the new rates produce.

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## East St. Louis Will Appeal

### Company There Dissatisfied with Commission Decision Fixing Six-Cent Fare

The East St. Louis (Ill.) Railway is disappointed at the decision of the Public Service Commission of Illinois continuing in effect the 6-cent fare. The company regards the rate as confiscatory. As explained recently in the ELECTRIC RAILWAY JOURNAL the order extends the temporary order under which the company now operates to July 31 and specifies that the rate may, after that date, be extended in like manner without hearing. The railway company had petitioned some time ago for a 7-cent fare.

W. H. Sawyer, president of the railway company, issued a statement of which the following is a very brief summary:

#### RAILWAY PRESIDENT DISAPPOINTED

I have not had time to read the order, but have just noted the general conclusions and am naturally disappointed. My assumption is that we will immediately ask for rehearing in this case, as it would appear impossible to continue with 6-cent fare and still pay the present scale of wages and give good service. If we continue to be limited to a 6-cent fare it means that our rate of return is so low that we will be unable to secure necessary new money for needed improvements. The situation is just as serious for East St. Louis as it is for the East St. Louis Railway itself, because the interests of the city and the railway are and must continue to be mutual.

The valuation claimed by the company was $2,898,000. This valuation was supported by J. E. Allison, consulting engineer of St. Louis, who was retained by the company as an independent outside expert. The commission finds a valuation of only $1,560,000, but states that this valuation is not necessarily final but "is used in the present case without prejudice to the railway company or others in any future proceeding."

I regard this valuation as absolutely confiscatory, as there is no question whatever but that the actual cost of rails, ties, trolley wire, cars, and physical property which go to make up the railway undertaking was very considerably in excess of this amount.

#### INDEPENDENT VALUATION $2,750,000

Mr. Allison's valuation showed the actual physical property to be about $2,750,000, to which he rightfully contended should be added the cost of financing and other intangibles, which represent money the company actually spent, approximately $600,000. The order makes no reference whatever to Mr. Allison's testimony. Mr. Allison testified that the company should be allowed to earn a total of $300,000 a year, whereas the company is only earning under the 6-cent fare approximately one-third of this amount.

#### REPRODUCTION BASIS USED

As to the company's valuation the order states that this was "prepared upon a strict reproduction basis," whereas the facts are that in so far as all the physical property was concerned, this was prepared upon a strictly actual cost basis. I speak of this because a reproduction basis would give a higher valuation than we claimed, as no war-time prices were included in our figures, but the costs taken by us were the actual costs at the time the track or cars were built. We, of course, claimed that in addition to the $2,898,000 there were other expenditures when the company was purchased which were not included, but Mr. Allison took this all into account when he stated that the company should be allowed to earn, in his opinion, $300,000, where it did earn in 1918 approximately $113,000.

In addition to the $300,000, Mr. Allison rightly contended that there should be earned and set aside by the railway company for depreciation purposes an additional amount.

# Seven-Cent Charge Restored

## New Jersey Commission Refuses Request of Cities to Keep Fares at Six Cents Pending Action on Zone System

The Board of Public Utility Commissioners of New Jersey in a decision filed on May 3, granted the application of the Public Service Railway, Newark, for a modification of its order of Sept. 25, 1918, which stipulated that the company was to drop its fare from 7 cents to 6 cents on April 1. The decision of May 3 wipes out that stipulation and the rate goes back to 7 cents, with the additional cent for the first transfer. The 7-cent fare went into effect at midnight on May 3.

### $486,127 LOST IN THREE MONTHS

The old rate of 7 cents is to remain effective until the commission passes upon the zoning system of fares, which was prepared by the railway by order of the commission and is now before the commission, "or until this board shall find and determine other rates than those filed as aforesaid to be just and reasonable in the pending proceedings to determine the justness and reasonableness of the schedule of fares filed as aforesaid."

The decision of the commission is based on a comparison of the financial condition of the company on March 31 of this year, with Dec. 31, 1918. The board says it thus appears that the actual loss during the first three months of the present year amounts to $486,127. This is arrived at by adding the sum of $94,120, which represented the railways' surplus of Dec. 31, 1918, and the sum of $392,007, which represented the company's deficit on March 31, 1919.

In order to ascertain the elements entering into the operation of the lines of the company for the first three months of the present year, the decision of the commission includes an analysis of the operating statement for the first quarter, as compared with the same quarter of 1918. The first quarter of this year shows a deficit of $484,562, on March 31, as compared with $62,702 on the same date a year before.

### LABOR AND MATERIAL COSTS VERY HIGH

This is explained by the fact that whereas the railway operating revenue deductions in 1918, for this quarter, amounted to $3,115,272, they jumped to $4,554,392 for the same period of the present year. On this point the commission said:

> This large increase in railway operating deductions was naturally the subject of protracted investigation in the present proceedings. A fair deduction summarizing the reasons for the increase is as follows: The major part of the increase is due to the increased cost of labor and material and the company did a greater amount of work during the first quarter of 1919 than it did during the same quarter of the year 1918 because of the open weather which permitted the work to be done and which had prevented any work of a corresponding character to be done during the corresponding quarter of 1918.

It is pointed out much of this work was in the rehabilitation of the company's equipment. The testimony of the general manager is quoted in explanation. He stated, for instance, that on account of lack of labor in January, February and March, 1918, and the severe weather, only six cars were painted. In this connection the general manager's testimony is quoted as follows:

> And I defy anyone to point out one piece of track or one car which has been repaired which should not have been repaired.

The decision points out that the board has heretofore criticised the company because of its failure to provide a sufficient reserve for depreciation, and indicated in its order of July 10, 1918, the necessity for the proper maintenance and renewal of its railway by maintaining a sufficient depreciation reserve.

Nor can these expenditures of this year, which greatly swelled the operating expenses of the first quarter, in the opinion of the commission, be properly ordered to what is known as the capital account of a company. Then the decision of the board sums as follows:

> BASIS OF EQUITABLE RATES
>
> Equitable rates should be based on the average expenditures during the period in which they are to prevail. It was established by the record that the expenditures for maintenance of property which the company was enabled to make by reason of the open winter exceeded the normal expenditures for that purpose, and the strike in March caused a further abnormal loss. With the necessary corrections made for such abnormal expenditures, however, it is apparent that, under the conditions existing during the second quarter of the year, a 6-cent fare will not enable the company either to recoup the losses incurred in the first quarter or possibly to pay its fixed charges during the second quarter considered by itself. If the company is to continue to render service to the public, all of the evidence in the case justified the board in concluding that it is necessary to permit the company to revert immediately to the tariff providing for a 7-cent fare and a charge of 1 cent for the initial transfer, subject to the board's jurisdiction to modify the same if and when conditions may warrant.
>
> It is urged by the municipalities that this board, having under consideration the putting into effect of a zoning system, shall necessarily require a revision of rates and should not act upon the present application but should dispose of the matter with the zoning plan. This is manifestly unfair. With full proof before the board that the railway is daily piling up a deficit, to refuse relief for the comparatively short period would be a flagrant failure of justice and a violation of duty.
>
> In the interim and until the schedule of rates or fares filed by the company with its report entitled "Plan for a Zone System of Fares Upon the Lines of the Public Service Railway" is approved by this board, or until this board shall find and determine other rates than those filed as aforesaid to be just and reasonable in the pending proceedings to determine the justness and reasonableness of the schedule of fares filed as aforesaid, the board will and hereby does modify the order of Sept. 25, 1918, in so far as the same provides for a charge of 6 cents on and after April 1, 1919, and will permit the charge of 7 cents where 6 cents is now charged. In all other respects said order to be and remain the same.

Frank H. Sommer, counsel for the municipalities opposed to a return to a higher fare, made a statement in which he said that he would advise the associated municipalities to make an application for a judicial review of the order. Among other things he said:

> For the sake of those who are financially interested in the Public Service Railway, and for the sake of those who require the service it affords, I sincerely hope that the game of hide-and-seek as to just and reasonable rates, which now has been going on for almost a year, may soon come to an end, and that as a result of a thorough investigation of all the elements entering into the problem stable rates may be established for the future.

The Mayor of Newark paid the 7-cent fare under protest, with the object in view of bringing suit for a judicial review of the decision of the commission. The appeal to the courts from the commission order will probably be given precedence on the court calendar.

The railway is distributing a sixteen-page pamphlet, "Inside Facts About Public Service Railway," being testimony of President Thomas N. McCarter before the commission in connection with the proposed zone-fare system.

## Wants Increase in Mobile

The Mobile Light & Railroad Company, Mobile, Ala., has submitted to the City Commissioners a long statement in support of its petition for increased fares. This statement is signed by J. H. Wilson, president of the company. As the company puts it "Our company is now asking that the contract rate for a car ride be increased slightly, owing to our increased operating costs." The appeal is for 6 cents.

The statement starts out with a review of the franchise contracts establishing the 5-cent fare and then takes up in turn increased costs, how other kinds of business have met increased costs, fare increases elsewhere, the net income that changed into a deficit, the local ownership of the company, the indorsement of fair rates by leading public men, the matter of increased facilities needed for Mobile and the interests of the employees. In conclusion under "Draw Your Own Conclusions" the company says:

> We have shown that our company's lines did not earn enough in the past six months to pay operating expenses and fixed charges, falling behind to the amount of $7,136.
>
> We have shown that including amounts paid for improvements and betterments the deficit was $25,718.
>
> We have shown that we now have no surplus, but a deficit, so we can not take care of ordinary improvements and betterments, always required by an electric railway company.
>
> We have shown that the ultimate welfare of our employees is dependent upon the prosperity of the company.
>
> Our company has put the greater part of its net earnings for twenty-six years into the betterments and extensions of the property for your service, during which time it has paid only an average dividend of 0.85 of 1 per cent.
>
> There is no hope of a material reduction of expenses, as prices of coal and labor, our two chief items of expense, cannot be expected to fall enough to make any appreciable difference in our net income.
>
> We do not desire to increase the cost of school children's tickets.
>
> At this time, and not in the future unless it becomes necessary, do we expect to ask for an increased fare on the Whistler, Magazine Point or Spring Hill divisions, on account of the passengers on said lines having to pay two fares to reach the city.
>
> To-day the electric railway fare in Mobile is the only commodity that has not only not increased over its price in 1917, but is actually just the same price it was in 1892, with vastly improved and increased service. The last commodity to increase is the 20 per cent advance by the post-office department for telegrams.

## From the Loop, Chicago, to Milwaukee

Plans are progressing for operation of fast electric trains of the Chicago, North Shore & Milwaukee Railroad into the heart of Chicago. This road is operated in conjunction with the Northwestern Elevated Railroad, Britton I. Budd being president of both. The elevated cars continue north of Chicago to Wilmette, paralleling for a few miles the service of the North Shore road, which has its southern terminus in Evanston. Part of the right-of-way used by the elevated lines is owned by the Chicago, Milwaukee & St. Paul steam road, and negotiations are being conducted with the management of that company to permit electric trains to continue into the loop district of Chicago from Milwaukee. This is expected to prove a boon for interurban passengers, affording cheaper and more convenient transportation between Chicago and the north shore towns than is possible by use of the steam railroads. The North Shore road has been doing a profitable business owing to the heavy travel to and from Fort Sheridan and Great Lakes Naval Training Station.

## Liberty Becomes License in Seattle

Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has asked the City Council to pass legislation intended to correct practices on cars which developed during the war when shipyard workers received special consideration on account of congested conditions. For instance, smoking was originally prohibited on all street cars. This rule was modified during the war so that smoking was allowed on the early cars, which contained shipyard workers almost exclusively. This liberty soon degenerated into license, with the result that the practice of smoking was gradually carried over to practically all hours of the day on certain lines. Arguments between smokers and non-smokers were the result. As a preliminary to the enforcement of the proposed legislation forty inspectors and other municipal railway employees have been given police commissions.

## Fare Arbitration in Kansas City, Kan.

Judge John C. Pollock of the Kansas Federal Court has named A. L. Berger, an attorney of Kansas City, Kan., and Frank Hagerman, Kansas City, Mo., as arbitrators to adjust the fare and other disputes between the city of Kansas City, Kan., and the Kansas City Railways.

The appointments were made after word had been received from Topeka that the State Public Utilities Commission of Kansas had agreed to the arbitration plan. Judge Pollock said that he selected Mr. Berger and Mr. Hagerman because both were familiar with the Kansas City railway situation.

Judge Pollock said that he has felt for some time that the railway dispute would never be settled except through arbitration. The questions of fares, of franchises and all public contracts, the use of the Inter-City viaduct and the removal of the "L" road structure will be considered.

Under the stipulation for arbitration Judge Pollock retains the right to modify the findings of the arbitrators if he desires to do so. The city has bound itself to adopt such ordinances as may be necessary to enforce the findings of the arbitrators.

## Many Angles to Spokane Case

The City Council, of Spokane, Wash., according to Mayor C. M. Fassett, will refuse a franchise to the proposed consolidated company to take over the local lines of the Spokane Traction Company and the Washington Water Power Company, unless the city obtains a provision for municipal ownership. The local lines are making an effort to consolidate, and the Council has gone on record as opposing any form of franchise that does not include the municipal-ownership provision. While the city has no immediate intention of buying out the lines, according to Mayor Fassett, "it is watching with interest the struggle in Seattle."

The city will also renew its fight for 5-cent fares, according to Mayor Fassett. He states that the consolidation will not only bring about a price value for the system, which would be a basis for possible municipal purchase later on, but will also make the justified earnings of the investment less than in the past.

The City Council is holding over the heads of the local railways the threat of unrestricted jitney competition, although agreeing to hold up the bus licenses until the end of the ninety-day trial with the 6-cent fare recently authorized. On the other hand a strong faction in the City Council is in favor of putting the jitneys out of business, if it will help restore the 5-cent fare.

## Increase Likely in New Bedford

The Union Street Railway, New Bedford, Mass., one of the most conservatively managed and most successful electric railways in all New England, is confronted with the need of increasing its fares. Increases in the costs of materials and supplies and jitney competition are held to be responsible for the depletion of the company's earnings. Company officials estimate that the operation of jitneys has taken $100,000 in revenue from the railroad. It is said that the only hope of the company in sight lies in the new jitney regulations about to go into effect, which require a bond of $2,500 and put the jitney operators under so many restrictions that it is believed it will drive the jitneys out of business. The company will not apply to the Public Service Commission for authority to increase fares until the results of the new jitney regulations are apparent.

## Fare Rehearing Asked in Chicago

An application for a rehearing and for the introduction of additional evidence in its fare case was filed by the Chicago (Ill.) Surface Lines on May 1 before the Public Utilities Commission of Illinois. The petition asked that the case be reopened so that the companies could present full and complete evidence with reference to the value of the lines, the commission having recently refused an increased fare on the theory that the companies were earning a reasonable return on a fair valuation of the properties.

In explaining this latest move, L. A. Busby, president of the company, said:

> Our petition for increased fares was presented last November as an emergency measure. In similar cases, decided about that time, the commission granted increases without making a complete and detailed valuation. We proved up the city purchase price as established by the 1907 ordinances, and considered this evidence sufficient upon which to base an emergency order for an increase in fares. The commission, however, finally decided not to treat our application as an emergency matter, and said that the time had come to return to the former course of procedure—that is, a complete valuation of the properties when making a change of rates.
>
> The commission rejected a number of items in our capital account, amounting to several millions of dollars, and pointed out that it did so because there was no evidence, or insufficient evidence, to satisfy the members, regarding these items. We believe the fair value of the properties is in excess of the purchase price. We will also point out that some of the estimates of the commission as to income available to meet fixed charges are, notwithstanding our increase in traffic, at the rate of several hundred thousand dollars per annum in excess of the earnings which will be realized.

## Three Cents a Mile for Interurban

The Public Service Commission for the Second District of New York has approved proposed increased fares on the Rochester & Syracuse Railroad on a 3-cent-a-mile basis except in the city of Rochester. The company has been directed to charge a 5-cent fare from Rockwood Street to the city terminal of the New York State Railways. The company under the tariff which it filed on a 3-cent-a-mile basis provided for a 5-cent fare from Rockwood Street to Culver Road and another 5-cent fare from Culver Road on the New York State Railways' tracks. The railroad consented to eliminate the proposed Rockwood Street to Culver Road fare.

The commission holds that with this exception the proposed new rate of fare is just in amount and necessary to yield reasonable compensation for the service rendered, taking into account the present cost of operation. Existing rates are 2.5 cents a mile by ticket, 2.75 cents cash with one-quarter cent refund, 1.25 cents a mile for thirty-day, fifty-ride commutation books and 1.6 cents per mile for fifteen-day twenty-five-ride East Rochester to Culver road. New rates to go into effect are 3 cents a mile by ticket, 3 cents a mile by cash with 10 cents excess redeemable and 1.5 cents and 1.6 cents per mile for the commutation books and mileage books at 2.5 cents a mile.

### Hastings Rebels

Hastings-on-the-Hudson, a quiet little town snuggled in the valley of the Hudson some distance below Storm King and within easy distance of the bridge over which the headless horseman of the "Sketch Book" rode, has had its silence disturbed, its bucolic existence disrupted and its family life thrown into turmoil by a railway controversy. All Hastings is walking. In fact, all Hastings has to walk. This is established beyond a doubt, however much some of the other moves of the Yonkers Railroad and its opponents may be obfuscated by the conflicting news reports of suits, counter suits, injunctions unheeded, etc.

The Yonkers Railroad was in need of added revenue. Of this it convinced the Council of Yonkers. Hastings, however, remained unconvinced. When the railroad began to collect an extra fare at the limits of Yonkers, passengers to Hastings became obdurate. But the company was insistent. Conflicts between employees of the railroad and passengers followed. Then the railroad, with the approval of the Public Service Commission, decided to abandon service in Hastings. This it did while Hastings was making up its mind to secure an injunction to prevent the discontinuance of operation. When the court order restraining the company was ready all Hastings was walking. A railroad that has already abandoned service cannot be prevented from abandoning service. An injunction does not hold that is issued to prevent something being done that already has become an established fact. Hastings was isolated from Yonkers and from New York. In time, no doubt, the town would have become reconciled to isolation from Yonkers, but to be cut adrift from New York was more than Hastings could endure.

Meanwhile the opposition to the fare increase in Yonkers was organizing. The dissenters prepared to fight. As a first move they sought the courts. In consequence there is now pending before Supreme Court Justice Morschauser an action seeking to require the railroad to give passengers rebate checks pending the final settlement of the legality of the extra fare charge. As for Hastings, it still remains cut off from New York, so far as access to that city over the Yonkers Railroad is concerned.

### Wants Seven Cents in Jamestown

A conference has been called in Jamestown, N. Y., between A. N. Broadhead, president of the Jamestown Street Railway, the municipal authorities of the city and Charles R. Barnes, electric railway inspector of the Public Service Commission for the Second District, in an effort to bring about an agreement between the city and the company regarding the discontinuance of transfer service between the company and the Warren & Jamestown Street Railway. The Jamestown Street Railway also seeks a 7-cent fare.

In a communication to the City Council of Jamestown, President Broadhead calls attention to the fact that unless a 7-cent fare is granted the company will have to discontinue its Willard Street line, the latest addition to its system. He points out that the company lost $70,000 last year and that the company has never paid any dividends. The City Council seeks to force the company to issue transfers to the Warren & Jamestown Street Railway. The Warren & Jamestown Street Railway has already discontinued giving transfers for the Jamestown local lines.

### Jitney Measure Re-enacted

The ordinance in Huntington, W. Va., placing severe restrictions on jitney traffic, which was repealed last July when service on the Ohio Valley Electric Railway was impaired by lack of power, was re-enacted by the City Commissioners on April 30 at the instance of George I. Neal, attorney for the company. Mr. Neal stated the company was preparing to build the South Side line and would be required to float a bond issue to defray the expenses of the improvement. He explained that it would be difficult to sell bonds as long as there was no statute on the books restricting jitney traffic. The ordinance re-enacted on April 30 requires every company operating jitneys to furnish a $5,000 bond for every vehicle in operation and to pay a license fee of $50 for each bus of four-passenger capacity. The jitneys are further required to follow a fixed route and operate seven days a week on a regular schedule. A fine of from $10 to $100 or imprisonment for not more than thirty days is provided as a penalty for violation of the law.

## Transportation News Notes

**Skip Stops for Municipal Line.**—Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has announced that the skip-stop system will be employed on the Seattle Municipal Railway. Details of the proposed plan have not yet been worked out.

**Fare Petition Renewed.**—The Topeka (Kan.) Railway has applied to the Public Utilities commission for a 6-cent fare. The commission denied a similar increase a month ago, but the company states in the new petition that it has been compelled to increase wages in the meantime.

**Government Road Increases Fare.**—On the Nipissing Central Railway North Colbalt, Ont., Can., an electric railroad owned by the Dominion government, fares have been raised 25 per cent. Within the limits of Cobalt, Haileybury and New Liskeard the fare is now 7 cents.

**Detroit United Class Rate Increase.**—The Detriot (Mich.) United Railway has been authorized by the Interstate Commerce Commission to increase its class rates 25 per cent, but to retain its freight rates at not more than those charged on steam railroads between the same points.

**Orders Fare Increase Suspension.**—The Public Service Commission of Massachusetts has ordered the Massachusetts Northeastern Street Railway, Haverhill, Mass., to suspend until May 15 the operation of the company's tariff proposing an increase in the single cash fare from 6 cents to 10 cents.

**Making the Most of It.**—The Philadelphia (Pa.) Rapid Transit Company is advertising in the cars of its surface lines and on the stations of its elevated and subway rapid transit line that whereas Philadelphia has a 5-cent fare in Boston 8 cents is charged, in Pittsburgh 7 cents and in St. Louis 6 cents.

**Fare Referendum in Akron.**—Opponents of the city ordinance providing for an increase in fares to 6 cents on the lines of the Northern Ohio Traction & Light Company in Akron have filed petitions for a referendum. City officials said that the referendum would be submitted at a special election not later than May 20.

**Fare Request Refused.**—The City Council of Decatur, Ga., has voted unanimously to deny the petition of the Georgia Railway & Power Company, Atlanta, Ga., that the 5-cent fare contract existing between Decatur and the company be suspended and the company be permitted to charge 6 cents fare on this line.

**New Fare Accounting Plan.**—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has agreed with its employees that the p-a-y-e fare boxes shall remain locked and be opened only by representatives of the company. The railway company will accept all mutilated coins and will not take into account with its men any shortages or overs.

**Reduction in Buffalo-Niagara Falls Fares.**—The International Railway, Buffalo, N. Y., under a tariff supplement filed with the Public Service Commission for the Second District, and proposed as effective on June 1, will reduce joint one-way fares from Buffalo via Niagara Falls and Niagara Gorge Railroad, $1.10 to 97 cents to Lewiston and $1.25 to $1.17 to Youngstown.

**Fare Increase on Columbus Suburban Line.**—A new fare schedule, providing for an increase of 1½ cents per zone, has been put into effect on the Westerville line of the Columbus Railway, Power & Light Company, Columbus, Ohio. This was done on the contract for a sliding scale, made two years ago. When the working capital for the line falls below $15,000, the rate of fare is increased and when this fund reaches $25,000, the fare is reduced.

**Asks Increase in Freight and Passenger Rates.**—The hearing on the petition of the Ohio Electric Railway for an increase in freight and passenger rates has been set by the Public Service Commission of Indiana for May 8. The company is asking for permission to increase fares on the lines to a basis not exceeding 3 cents a mile for passengers between all stations in Indiana and for authority to increase freight rates approximately 25 per cent between all stations on the railway in the State.

**Seven Cents in Vancouver, Wash.**—The Public Utilities Commission of the State of Washington has authorized an increase from 5 cents to 7 cents in fare on the lines of the North Coast Power Company in Vancouver, Wash., to become effective at once. One of the urgent reasons given for asking the increase is the increasing number of automobiles in use in the city, detracting from the company's revenues. A few months ago, permission was granted the company to raise the fares on the interurban lines to Sifton and Orchards.

**Fare Settlement in Battle Creek.**—Battle Creek's controversy with the Michigan United Railways, Jackson, was settled on April 28. The company is allowed to return to 6-cent fares, but is required to sell nine tickets for 50 cents. There will also be a flat 5-cent fare for workingmen between 6 and 8 o'clock in the morning and 5 and 7 o'clock at night. Conductors will be required to carry workingmen's tickets. For a week previous to the settlement of the controversy the company charged only 5 cents, but refused to give transfers.

**Agrees to Increase of Interurban Fare.**—On May 3 the City Council of Warren, Ohio, passed a twenty-five-year franchise which grants an increase in fare to the Mahoning & Shenango Railway & Light Company as follows: Between Warren and Niles, from 5 cents to 10 cents; between Warren and Girard, from 10 cents to 20 cents, and between Warren and Youngstown, from 15 cents to 25 cents. Before the franchise becomes effective, however, it must be ratified by the Councils of Niles and Girard and by the Commissioners of Trumbull County.

**Plea for Equalization of Tariffs.**—A petition has been filed with the Public Service Commission of Indiana by the interurban railways operating in Indiana to change the tariffs being used by the lines. The companies ask that they be placed on the same basis of rates as the steam lines. The petitioners are seeking to increase the rates slightly on short hauls and to decrease the rates on long hauls. If the changes are granted they are not expected to increase the operating revenues of the companies. The changes are being sought principally for the purpose of removing discrimination.

**Not Partial to Zone Plan.**—W. F. Ham, president of the Washington Railway & Electric Company, Washington, D. C., on May 5 reiterated that the company is by no means insistent upon zone charges. It merely has proposed this plan as one of several offering a possible solution of the company's financial difficulties. The company, he stated, has withheld no facts bearing upon its inability to continue furnishing service at the present rates and is willing to leave to the Public Utilities Commission the question of how it shall obtain sufficient revenue to enable it to exist.

**Increased Fares Suspended in Schenectady.**—The Public Service Commission for the Second District of New York at its regular session on April 29 further suspended the effectiveness of proposed increased rates by the Schenectady Railway until May 31, inclusive. Increased fares under suspension are in Schenectady and on the three interurban divisions. The railway has filed a new application for permission to increase its fares in Schenectady from 5 cents to 6 cents. With the application there was filed a certified copy of the ordinance adopted by the Common Council of Schenectady waiving the city's 5-cent fare rights under the existing franchises.

**Service Case Practically Closed.**—The New York State Railways, Rochester Lines, on May 1 practically closed its evidence before the Public Service Commission for the Second District, under the order to show cause which the commission issued relative to increased service in Rochester. Corporation Counsel Cunningham cross-examined Chester G. Brown, an accountant, over various charges and the apportionment to the Rochester city and interurban lines. Mr. Cunningham asked for some additional information along this line which the railway said it would produce at an adjourned hearing in Albany on May 19. The case will be submitted at the next hearing.

**I. C. C. Denies Service Order.**—On the ground that it is without jurisdiction to require increased service even when an increase in revenue is granted, the Interstate Commerce Commission has denied a petition of the city of New Albany, Ind., and others for a rehearing of the application of the Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company for an increase in fares. The companies had been granted an increase from 5 cents to 7 cents. The petitioners sought to require them to double the number of motor cars and trailers in use and to establish at certain hours a fixed time schedule.

**Columbus President Not Entirely Satisfied.**—Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, on his return from Mexico, took up the study of the new ordinance through which the company would be authorized to operate at a fare of six tickets for 25 cents for two years. Mr. Kurtz said that the rate was not sufficiently high to give the people the service they desired and the company would like to offer. He said figures were being prepared which would show where all the money collected was being expended. Every body would know just what was being done and there would be no need of guessing in the future. A referendum is planned on the six-for-a-quarter fare.

**Eight Cents in Girardville.**—The Public Service Commission of Pennsylvania has announced that "as an emergency measure and for the purpose of giving the company what appears to be the necessary relief" it had granted the application of the Schuylkill Railway, Girardville, Pa., to charge an 8-cent fare, but refused the company the right to sell thirteen tickets for $1. Instead the railway is to sell seven tickets for 50 cents. The decision was rendered in the complaint of the boroughs of Mahanoy City and Ashland and an application of the company for the right to charge an 8-cent fare. The tariff is to be effective on one day's notice and to run until June 1, 1920.

**Suburban Fares Reduced in Rhode Island.**—Reductions in fares on nine of the suburban lines operated by the Rhode Island Company, Providence, R. I., effective on May 1 were authorized by the Public Utilities Commission in an order issued on April 30, which continues in effect until further order of the commission the rates which have been in force on all other lines. The new rates are, with a few exceptions, the same as were proposed by the Rhode Island Company in tariffs filed with the commission on April 1. As explained in the review of the new fare tariff in the ELECTRIC RAILWAY JOURNAL for April 12, page 758, the new rates were offered as a basis for the readjustment of fares on the heavily traveled suburban line. It was suggested that they be tried for three months for the purpose of building up business, as they are lower than the company could offer on the previous volume of business.

**No Fare Action in New York City.**—The Public Service Commission for the First District of New York on April 30 decided to take no further action on the applications of the various surface railways for authority to charge for transfers, because the Board of Estimate is adhering to its decision not to modify the franchises, thus leaving the commission practically without jurisdiction. The commission has felt that the increase in operating expenses should be followed by some concessions in the fare rate, either by a direct increase in the fare, the abrogation of transfers, or a charge of 3 cents for them. It is stated that if the law legislating the present commission out of office had not been enacted some definite steps might have been taken to settle the question of the rate-making power of the commission, but the outgoing commissioners did not feel that they should do anything that might embarrass their successors.

# Legal Notes

FEDERAL COURTS — *Ruling on Free Transportation of Detectives by Philippine Supreme Court Not Renewable by United States Supreme Court.*

Under Section 248 of the Judicial Code the Supreme Court had authority to review decisions of the Supreme Court of the Philippine Islands (a) where the constitution or any statute, treaty, title or privilege of the United States is involved, or (b) where the value in controversy exceeded $25,000. Hence, a ruling of the Philippine Supreme Court that a franchise ordinance which required free transportation of members of police department did not apply to detectives with such badges concealed, was held not to come within the jurisdiction of the United States Supreme Court as not falling within the two classes of cases mentioned above. (Board of Public Utility Commissioners *vs.* Manila Electric Railway & Light Co., 39 Supreme Court Rep., 272).

CALIFORNIA—*Injury to Person Between Tracks—Contributory Negligence.*

Where, in daytime, a passenger after alighting from a street car, walked around its rear and was injured by being struck by the projecting step of a passing car on the other track, while in a space between the tracks wide enough to permit a clearage of 43 in. between passing cars, she was guilty of contributory negligence as a matter of law, and a nonsuit was properly granted. (Ross et al. *vs.* Pacific Electric Ry., 179 Pacific Rep. 538.)

NEW YORK—*Negligence of Pedestrian Held Responsible in Spite of Ordinance Violation.*

One who alighted from a street car, stood until the car had gone 30 ft., then started to cross the street, looking and listening when he could see about 40 ft., and then crossing the opposite track, where he was struck by a car going 20 m.p.h., was negligent, although there was an ordinance requiring street cars to reduce their speed to 5 m.p.h. while approaching and passing a standing car. (Schasel *vs.* International Ry., 571 New York Sup., 571.)

NEW YORK—*Orders of Public Service Commission Must Be Executed.*

Where the Public Service Commission directed a company to install an interlocking signal device at a crossing and there was long delay in enforcing the order, and the price of materials had greatly increased, compliance with the order will be compelled by mandamus, despite the company's claim of financial inability. (Public Service Commission, Second District, *vs.* International Ry., 174 New York Sup., 708.)

NEW YORK—*The Raising of Trolley Wires to Let a High Obstruction Pass.*

A street railway cannot interfere with the reasonable use of the street by others, even where such use involved temporary obstruction of traffic or interference with wires, as by the moving of a pile driver 16 ft. high. Where the company was informed that such an obstruction could not pass across the street without coming in contact with trolley wires, and sent a wrecking gang of men to raise the wires, such a gang was not a mere "volunteer," but was performing a legal duty and would be liable for injuries due to negligence in undertaking to raise the wires to prevent contact as the truck passed under them. (Chace Trucking Co. *vs.* Richmond Light & Railroad Co., 122 Northeastern Rep., 210.)

NEW YORK—*Collision Because Motorman Lost Consciousness Not Negligence Per Se.*

Where a street car motorman fainted in his cab and caused a collision, the responsibility of the company for the motorman's failure to exercise reasonable care must be determined in the same manner as any other question arising in the course of the motorman's employment. (Goldman *vs.* New York Rys., 173 New York Sup., 738.)

WISCONSIN—*Reservation of Certain Cars for Interurban Traffic Held Reasonable.*

A regulation of an electric railway company reserving interurban cars for interurban traffic only and excluding city traffic therefrom, was held to be a reasonable one, such a system having been approved by the Railroad Commission. (Campbell *vs.* Milwaukee Electric Railway & Light Co., 170 Northwestern Rep., 937.)

WISCONSIN—*Company Not Responsible for Injury to Workman Near Track.*

Where a laborer working near the tracks of a street railway was injured by a passing car and neither his duties nor any obstruction of view prevented him from seeing the car, his failure to keep a proper lookout was negligence preventing recovery. (Yellick *vs.* Milwaukee Northern Ry., 170 Northwestern Rep., 941.)

# New Publications

### Industrial Safety Codes

Report of conference at the Bureau of Standards, held on Jan. 15, 1919. United States Bureau of Standards, Washington, D. C.

This pamphlet contains a brief report of the conference and a proposal for the organization of an American Standards Association.

### Saving Coal in Steam Power Plants

Reprint of Engineering Bulletin No. 2, prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Five cents per copy. Address Superintendent of Documents, Government Printing Office, Washington, D. C.

A practical little pamphlet which should be in the hands of every man responsible for the operation of any part of a steam power plant.

### Thirty-fifth and Thirty-sixth Annual Reports of New York Electric Railway Association

Published from the office of the secretary of the association, Rochester, N. Y.; 275 pages.

This volume just issued contains the proceedings of the annual meetings on June 27, 1917, and June 22, 1918, the quarterly meeting of March 2, 1917, and the special meetings of Dec. 13, 1917, and April 29, 1918.

### Combustion and Flue Gas Analysis

Technical Paper 219 of the United States Bureau of Mines, reprint of Engineering Bulletin No. 4 prepared by United States Fuel Administration in collaboration with the Bureau of Mines. One copy free from the Bureau of Mines, other copies at 5 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

This bulletin contains practical information based on an article by Joseph W. Hayes, combustion engineer, and is in the nature of a set of directions for securing efficient fuel combustion.

### Industrial Electrical Measuring Instruments

By Kenelm Edgcumbe. D. Van Nostrand Company, 25 Park Place, New York, N. Y. 414 pages. Illustrated, cloth, $5 net.

This is the second edition of the author's book and it includes very considerable revisions from the original text. The subject of electrical measurements is covered with due regard for theory, but without complicated mathematics. There is little of detail regarding commercial instruments, although a number of such devices are described by way of example. These examples are, however, all drawn from British practice.

### Analysis of Tests of Rigidly Connected Reinforced Concrete Frames

Bulletin 107, University of Illinois Engineering Experiment Station, Urbana, Ill. Copies may be had without charge from the station.

This bulletin gives the results of a series of tests conducted to obtain experimental information on stresses in the reinforcement and the concrete, the continuity in the composing members of a frame, the locations of sections of critical stress, the reliability of a reinforced-concrete frame and the applicability of the theoretical formulas in the design of frames. The following cases have been analyzed for vertical load: Single-story frame, single-span; single story, three-span; trestle bent with tie, single-span; building frame with several stories and several spans, and bridge trestle. For horizontal load, single story, single-span; octagonal reservoir or tank, and rectangular reservoir or tank have been analyzed.

# Personal Mention

**Lewis Nixon**, State Superintendent of Public Works of New York, has been appointed by Governor Smith to be Public Service Commissioner for the First District of New York (Greater New York) in charge of regulation. Mr. Nixon was born at Leesburg, Va., fifty-eight years ago. He was graduated from the Naval Academy in 1882 at the head of his class. He served on the staff of the chief constructor of the navy, being detailed to Cramp's, Philadelphia, and to the Navy Yard in New York. He afterward had his own yard at Elizabeth, N. J. As a naval constructor, Mr. Nixon designed the Oregon, the Indiana and the Massachusetts. Mr. Nixon was a member of the East River Bridge Commission in charge of the construction of the Williamsburg Bridge. He won national fame as the man who built the first really big battleship of the American Navy, the Oregon. For a time he was leader of Tammany Hall.

**Joseph E. Dozier** has resigned as general manager of the Nahant & Lynn Street Railway Lynn, Mass., to become sales manager of the Northway Motor Organization Company of Boston and Natick, Mass. Mr. Dozier entered the traction field only fourteen years ago. He was born in Barnesville, Ga., in 1867, and was reared in Macon, Ga., graduating from Planters' Academy in 1886. In his boyhood he was employed as night operator by the Southern Bell Telephone & Telegraph Company for five years. This experience led to his appointment as an exchange manager soon after leaving school. He remained with the Southern Bell Company until 1894, when he was called to Boston by the New England Telephone & Telegraph Company. He served as manager of various exchanges until 1905 when he resigned to become associated with the Nahant & Lynn Street Railway, which he constructed and has operated ever since. He was elected president of the New England Street Railway Club at the annual meeting of the club last March.

**Joseph F. Berry** has resigned as attorney for the Connecticut Company New Haven, Conn., to engage in private practice in Hartford. Mr. Berry spent practically all of his time, since graduation from college, as attorney for street railway corporations. He was born on Feb. 13, 1880, in Boston. He attended the public schools in Boston and was graduated from Tufts College in 1901 with the degree of A. B. He was graduated from Harvard Law School in 1904 with the degree of LL.B. Mr. Berry entered the office of Choate, Hall & Stewart, Boston, in July, 1904, where he was principally engaged in preparation and assistance in defense of personal injury actions against the Boston Elevated Railway, the New York, New Haven & Hartford Railroad and the Boston & Albany Railroad. On Oct. 1, 1907, he resigned to accept the position of assistant attorney of the New York, New Haven & Hartford Railroad in New Haven. He engaged in the trial of cases for the railroad and affiliated companies in Connecticut until March 1, 1914, at which time the Connecticut Company was separated from the New York, New Haven & Hartford Railroad. He was appointed attorney for the Connecticut Company, the New York & Stamford Railway and the Westchester Street Railway on March 1, 1914, and acted as such in trials in all counties of Connecticut. During the last two years he did much general legal work. Mr. Berry was admitted to the Massachusetts Bar in February, 1904, at Boston; the Connecticut Bar November, 1907, at New Haven and the United States Supreme Court Bar in October, 1910, and also is a member of the Bar of the United States District Court and the Circuit Court of Appeals for New York District.

# Obituary

## George O. Nagle Dead

George O. Nagle, who for twelve years up to November, 1915, had been general manager of the Wheeling (W. Va.) Traction Company, died at his home in that city on April 15. Death was due to complications from stomach trouble. At the time of his death Mr. Nagle was city manager of Wheeling. He was the first incumbent of that office and was elected to it in June, 1917, when Wheeling adopted the city manager form of government.

Mr. Nagle was born in Milton, Pa., on Dec. 31, 1868, and moved to Chicago in 1886. Shortly after this he entered the employ of the Chicago, Burlington & Quincy Railroad, serving first in the ticket auditor's office and later in that of the general auditor. In February, 1891, he entered the employ of the Chicago City Railway as junior in the claim department. Six months later he was promoted to the position of private secretary to the superintendent, and in 1898 was appointed superintendent. After he resigned from the Chicago City Railway he became connected with Stone & Webster, first as manager of the Savannah (Ga.) Electric Company and later in general charge of the properties of this firm in the Southeast. He left the Stone & Webster interests to go to Wheeling in 1903.

Mr. Nagle's ability as a railway manager soon became appreciated in Wheeling and not only brought about good public relations and improvement in the service, but led to his active participation in many civic enterprises. Thus he became an influential member of the Board of Trade, entered the Playground Association and at the time of the Panama-Pacific Exposition was appointed by the Governor a member of the State Exposition Commission. Shortly after leaving the traction company in 1915 he was elected president of the Morris Plan Bank and also president of the West Virginia Manufacturers' Association. His work as city manager was attended by many reforms and economies. In referring to his death the Wheeling *Majority* said, in part:

> He could have been a millionaire. Men with much less mental equipment have made much more. But he chose instead to serve others instead of himself. He viewed the city government not as a pension list or public corral but as a public utility, designed to do collectively for the people the things they could not do for themselves. His example of public service cannot help but live.

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**Thomas B. Jennings**, shop foreman for the Texas Electric Railway at Sherman, Tex., was killed by an automobile recently. Mr. Jennings was supervising some track work in front of the company's carhouse in Sherman when he was struck by a passing automobile. Mr. Jennings suffered a fractured skull and other injuries to which he succumbed in a few hours.

**Charles Andrew**, president of the Electric Railway Equipment Company, Cincinnati, Ohio, is dead. Mr. Andrew, was born at Cincinnati, Ohio, on Feb. 14, 1850. He was a son of Peter Andrew, long identified with the business life of Cincinnati and at one time vice-president of the Chamber of Commerce. Early in his career Charles Andrew was connected with the grain business. He was, however, greatly interested in electricity and with the introduction of electric traction in the early nineties became identified with his brothers in the manufacture of tubular steel street railway poles. With this as a beginning the business was gradually extended to include overhead line material and electric light poles. With the introduction of a patent wirelock swedged joint the business in steel poles greatly increased and there are now few cities in this country or foreign countries where poles with this type of joint are not now well known. Some two years ago Mr. Andrew's failing health compelled him to give up an active participation in business. His health continued to fail and on April 29 he died. In his death the electric railway business loses a pioneer manufacturer and one of the most popular men connected with the production of electric railway materials.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Italian Railways Desire American Equipment

### Water Powers Easily Developed—Credit System Must Be Substituted for Present Cash Transactions

Before the pressure of war required Germany to curtail her output of electrical machinery for commercial purposes, Italy purchased most of its electrical power-house machinery and railway supplies from that country. When new railroads or traction systems were projected the Italian government, principality or municipality issued subsidies for the work. Much of the capital needed was raised by the territory affected and in many cases the remainder came from Germany.

A single German bank for financing projects of electrical power houses only loaned the required balance of capital and supplied the electrical machinery through the German manufacturing companies. Thus the Italians, with a certain amount of capital, were enabled to secure sufficient credit to carry out their electrifications. And the machinery came from Germany and the lien on the property was held by Germany.

#### AMERICAN CREDIT WANTED

To-day the Italians are seeking credit in the United States, a prominent Italian engineer who is in this country told a representative of the ELECTRIC RAILWAY JOURNAL, to enable them to construct new traction systems and electrify existing steam lines through the use of American equipment. It has been stated that the cash basis of Americans has been and now is keeping back needed electrifications. A suggestion has been made that an American bank be organized to extend credit on electrical machinery to Italy; 50 to 70 per cent of the total investment has been mentioned as the amount of capital which the Italians could normally invest in the project, while the balance would be necessary in credit from this bank.

Many municipalities in Italy are now connected with light steam lines. The operation of these lines, it has been stated, is almost impossible. Coal is high, the wood substituted for it is green and poor burning and the equipment is in bad repair. Water power is abundant and about 2,000,000 hp. is so available as to make its harnessing a simple task.

Of the many industrial enterprises directly damaged by the war, electric power plants suffered to the extent of approximately $5,000,000. This industry is third in the list, having been surpassed by cotton and silk mills.

## Open Market for Iron and Steel

### Lower Prices for a Short Time May Result, but Prices Later Will Be Higher

As has been confidently expected for some time the plan of the Industrial Board to stabilize steel prices by fixing minimums for the current year has failed. The steel producers and the representatives of the Railroad Administration were not able at their meeting on Thursday to agree on minimum prices following the refusal of the Railroad Administration to accept the prices earlier agreed upon by the steel producers and the Industrial Board. The Railroad Administration held out for more than $3 a ton less for Bessemer rails than the price in the Industrial Board schedule. An open market for iron and steel products now exists. The Railroad Administration is to ask at once for competitive bids on 200,000 tons of rails.

By this action the stage is once more set for big business. Ever since the refusal of the Railroad Administration to accept the minimum prices first agreed on, buying and construction have been held back in large measure. Now that a free market governed once more, after a lapse of many, many months, by the fundamental economic law of supply and demand, exists, agreater volume of business can be expected.

Prices of steel products including rails are, as a result of the meeting, in a peculiar position. The steel producers, it must be remembered, did not state that they would not sell for lower prices but that they would not agree to sell at these lower prices for the balance of the year.

Looking at the situation from every angle the most natural thing to expect is lower prices for iron and steel. In order to stimulate buying there is every reason to believe that the mill operators will accept orders at prices under the cost to produce. Just how far steel men will go in price cutting depends on the rapidity with which buying responds and the need of the individual producer for business.

One thing is certain—lower prices will not prevail for long. Just as soon as the producers are convinced that buying is opening in a substantial way, prices will stiffen. Before the year is over prices for iron and steel, according to present indications, will reach a level higher than the present.

From late in the year on the prices of iron and steel can be expected to fluctuate with a general tendency downward.

## Hewn Tie Prices Expected to Go Higher

### Electric Railway Market Affected by Government Demand — Labor Conditions Better

The market for hewn ties for electric railway work is influenced to a great extent by the demands of the steam railroads for that same product. At the present time the demands of the government-controlled roads are not being met by the producers of hewn ties. One manufacturer of ties states it as his belief that not one railroad in the country has sufficient supply to take care of its renewals. This manufacturer has notified his best customers that the tendency of hewn tie prices is upward, and that they should anticipate their summer needs and order sufficient for several months' supply by the first of June.

He attributes this rise in price to the small supply available. The government needs more ties for its roads than are now being supplied, and in order to stimulate production he anticipates that the government will offer a slightly higher price to the manufacturer.

This would probably be in the nature of a 5 cent or 10 cent increase per tie and possibly will be applied before the present month is out. The practice of the government has been to notify the manufacturers that it would pay a certain price over a given period, and it has step by step advanced these prices from time to time.

#### LARGE SUPPLIES NEEDED

The same tie is used for electric as for steam roads, and the same price changes will apply. In normal times about 70 per cent of the tie business is for renewals, while the 30 per cent is for new work. At present new work has dwindled to practically nothing. Orders are coming in in the neighborhood of 10 to 40 per cent of normal for renewals. This means that both steam and electric roads, principally the latter, are not keeping their roadbeds in shape. Some roads have not placed orders for two years. Consequently, when those roads do buy ties they will have to buy for a large portion of their track.

In the Southern tie camps labor conditions have improved in the last two months. The large number of hewers who left the industry short handed when the army attracted their attention have returned to civilian life and taken up their former work. Deliveries are consequently much improved and are expected to continue so.

## American Rails for British Traction System

### City of Birmingham Orders 2200 Tons —Price and Delivery Influencing Factors in Placing Order

The City of Birmingham, England, after inviting bids on material for replacing its street car rails, finally decided to place its order in American hands. The first quantity of 1000 tons was followed by an order for 1200 tons, and this material has now been shipped. When the British firms lost the contracts protests were so numerous that the municipal government issued an official statement.

One of the British bidders, it was explained, agreed to begin delivering fifty tons a week in April, but would not consent to a penalty clause for non-delivery; the other promised 1200 tons within twenty weeks. The firm in the United States agreed to complete delivery by the end of May and quoted a lower price than either of the British manufacturers. The price and the fact that the authorities were anxious to complete the work this year were the influencing factors in favor of the American bidder.

## Decline in Price of Controller Fingers and Segments

A prominent manufacturer of controller fingers and segments advises that prices of these articles of maintenance declined early in April. Although the traction companies are continuing sufficient sales to keep their controllers in running shape there has been no noticeable increase in purchasing.

Sufficient raw materials are stocked to care for increases in buying, and deliveries can be made for any quantities in about three weeks.

## Rolling Stock

**Denver & South Platte Railway, Denver, Col.,** announces the purchase of two safety cars from the American Car Company for June 1 delivery.

**Quincy (Ill.) Railway** will soon install twenty-five new one-man cars of the latest type. These cars will permit a five-minute service from the Soldiers' Home and a ten-minute service on State Street and Broadway and Tenth Street. The new cars will cost $6,000 each.

**Manufacturers' Railway, St. Louis, Mo.,** it is announced, has ordered six electric locomotives, of which two have been delivered, for the 24 miles of terminals now being electrified. These locomotives are capable of drawing forty loaded cars at 15 m.p.h., and are said to have cost $300,000.

**Central Illinois Public Service Company, Paris, Ill.,** will soon install three new pay-as-you-enter cars on the city line in Paris, it is reported. The cars will be one-man units with safety appliances and air-equipped doors and brakes, and they will be 28 ft. long and 8 ft. wide. The seating capacity will be thirty-two, with benches crosswise.

## Recent Incorporations

**Dayton & Tennessee Railway, Dayton, Tenn.**—Incorporated to build a short line in Dayton. Capital stock, $10,000. Incorporators: J. S. Frazier, E. M. Williamson, Jake Benkovitz, A. P. Haggard and W. H. Jones.

**Richmond & Ashland Railway, Richmond, Va.**—The State Corporation Commission has granted a charter to the Richmond & Ashland Railway to operate the line of the Richmond & Chesapeake Railway from Richmond to Ashland. Capital stock, $300,000. Officers: Jonathan Bryan, Richmond, president; D. R. Midyette and W. L. Foy, both of Ashland, vice-presidents, and Oliver J. Sands, Richmond, secretary and treasurer. It is expected that operation of the line will be begun soon.

## Franchises

**Petaluma, Cal.**—The Petaluma & Santa Rosa Electric Railway has asked the City Council of Petaluma for a franchise to construct an extension of its lines in that city for freight business.

**Covington, Ky.**—The South Covington & Cincinnati Street Railway has been granted a twenty-year franchise by the City Commissioners of Covington for the use of Rosedale and Latonia Streets.

## Track and Roadway

**Pacific Electric Railway, Los Angeles, Cal.**—Preliminary work has been begun by the Pacific Electric Railway for the construction of the proposed extension of its La Rambla system. The work will include an extension north of the present terminus in Bandimi Street, San Pedro, to the canyon located in the northern section of the Peck properties.

**Denver & South Platte Railway, Denver, Col.**—Improvements are being planned by the Denver & South Platte Railway to its system.

**Quincy (Ill.) Railway.**—The Quincy Railway plans to expend $100,000 for general improvements in Quincy.

**Worcester (Mass.) Consolidated Street Railway.**—To relieve traffic congestion at Main and Front Streets the Worcester Consolidated Street Railway proposes to construct a loop from Main Street through Madison, Portland and Franklin Streets, back to Main Street.

**Manufacturers' Railway, St. Louis, Mo.**—It has been announced that the Manufacturers' Railway, which controls 24 miles of terminals in South St. Louis, will be operated with electric motive power within the next few weeks. Power will be obtained from the hydro-electric plant of the Mississippi River Power Company, Keokuk, Iowa.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—During this year the Northern Ohio Traction & Light Company plans to construct a single track on Navarre Road from Garfield Avenue to Bryan Avenue SW and on Bryan Avenue and Twenty-second Street SW to the Canton Sheet Steel Company, a single track on Cleveland NW, a single track on Sixth Street SW and a single track on Fourth Street NW. The company also plans to build a Y at the end of Sixth Street and a siding on Tuscarawas Street.

**Dominion Power & Transmission Company, Hamilton, Ont.**—The Street Railway Committee of Hamilton contemplates the extension of the tracks south on Queens Street to Aberdeen, west to Dundurn Street, north to Charlton Avenue and east to the line on Locke Street.

**Fort Worth Mineral Wells Interurban Co., Fort Worth, Tex.**—The construction of the interurban line from Fort Worth to Mineral Wells, a distance of about 60 miles, is assured, according to H. E. Robinson, chairman of the executive committee of the Fort Worth-Mineral Wells Interurban Company. The line will be begun at Fort Worth and the 10-mile stretch to Lake Worth will be built at once. It is announced that this line will be in operation by the end of August. It is planned to use the tracks of the Northern Texas Traction Company to the end of the Rosen Heights car line, which will leave about 4½ miles to the lake. The company has been granted franchises through the cities of Weatherford and Mineral Wells [May 3, '19].

**Seattle (Wash.) Municipal Railway.**—Permanent improvements and additions to the Seattle Municipal Railway are provided for in an ordinance prepared by Corporation Counsel Meier, at the request of Thomas F. Murphine, Superintendent of Public Utilities, authorizing the sale of $520,000 in utility bonds. The ordinance has been introduced in the Council, and referred to the Finance and City Utilities Committees. Among the improvements proposed are the double-tracking of the Fauntleroy line on Avalon Way, the connection of the East Union with the Madrona lines at Thirty-fourth Avenue; extension of Division Avenue across Pine Street; extension of lines on south approach to Ballard bridge. If the ordinance is passed, it is proposed to provide money to start the work immediately by a loan to the street railway construction fund, and to pay it back when the bonds are sold.

**Ohio Valley Electric Railway, Huntington, W. Va.**—Plans are being made by the Ohio Valley Electric Railway for the construction of an extension to be known as the South Side line. Under the provisions of the franchise, the line must be completed not later than one year from the signing of the peace treaty, and it is believed that work on the new line will be begun before the middle of the summer.

## Power Houses, Shops and Buildings

**Georgia Railway & Power Company, Atlanta, Ga.**—It is reported that the Georgia Railway & Power Company plans additional water power development on the Tugaloo River.

**Decatur Railway & Light Company, Decatur, Ill.**—The Decatur Railway & Light Company has leased a tract of land 125 ft. x 500 ft. on Wood Street, just west of the Illinois Central Railroad, where the company will erect a new carhouse and shops. Upon the completion of these buildings the company will abandon practically all of their shops and other buildings in the city, with the exception of one warehouse.

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—According to an announcement made by Britton I. Budd, president of the Chicago, North Shore & Milwaukee Railroad, the company contemplates the removal of its terminal from Highwood to Waukegan and the construction of repair shops and switches at an estimated cost of about $100,000.

**New Orleans Railway & Light Company, New Orleans, La.**—A new 15,000-kw. turbine capable of producing 20,000 hp. is being installed at the central power station of the New Orleans Railway & Light Company in Market Street.

**Cumberland Railway & Power Company, Fayetteville, N. C.**—Plans are being made by the Cumberland Railway & Power Company for the erection of a hydro-electric power plant at Fayetteville, with an initial capacity of about 3000 hp.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—The Northern Ohio Traction & Light Company proposes to erect a new transmission line from Canton to Akron.

**Montreal (Que.) Tramways.**—It is reported that the Montreal Tramways contemplates the construction of a new substation at Cartierville.

**Lee Valley, Tenn.**—It is reported that John N. Adams, engineer, proposes to construct a hydro-electric plant and railway.

**Texas Power & Light Company, Dallas, Tex.**—Plans are being made by the Texas Power & Light Company for the construction of a power station at Strawn.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—The United States Engineering Department has granted permission to the Monongahela Valley Traction Company to construct a new high-tension transmission line over the Monongahela River near Hoult, W. Va.

## Trade Notes

F. X Cleary has resigned as manager of the New York office of the Electric Service Supplies Company, 50 Church Street, and is succeeded by Randolph Mann.

**Buda Company, Harvey, Ill.**, announces that F. W. Marvel has again joined the sales force of the company, and will be located at its New York office at 30 Church Street.

**Briggs & Turivas, Inc., Chicago, Ill.**, announce that they have opened a New York office at 1805 Equitable Trust Building. This office will be under the direction of the company's president, Carl R. Briggs.

**Terry Steam Turbine Company, Hartford, Conn.**, announces the appointment of R. L. Thomsen as sales manager. Previous to his appointment Mr. Thomsen was manager of the marine department for the Griscom-Russell Company.

**Van Dorn & Dutton Company, Cleveland, Ohio**, manufacturers of gears, has opened branch offices at New York and Chicago. At both cities it is the company's purpose to specialize in gears and pinions for electrical work. Harry F. Keegan, formerly with the Chicago Surface Lines, will manage the Chicago branch with offices at 1241 First National Bank Building. His brother, John Keegan, will manage in New York with offices at Room 317, 30 Church Street. The latter comes from the Interborough.

**Engineer Material and Equipment in A. E. F. Depots.**—The War Department News Bureau announces that the articles showing increase from Nov. 1 to March 1 are as follows: switches and fastenings, narrow gage, from 382 to 490 tons; narrow gage rails from 19,500 to 22,300 tons; copper wire and cable from 91,300,000 to 114,000,000 ft. Decreases were noted as follows: electric generators from 881 to 450; 60 cm. mfd. track from 6350 to 5430 tons; 80 lb. and 67½ lb. rails from 55,500 to 47,300 tons; standard-gage switches and fastenings from 9020 to 7180 tons.

**Adams-Bagnall Electric Company, Cleveland, Ohio**, announces the appointment of R. E. Uptegraff in charge of its transformer department. Mr. Uptegraff was with the Westinghouse Electric & Manufacturing Company seven years, where he had charge of turbine and switchboard operation and was connected with the manufacture of motors, generators and transformers and their accessories. He was also active in transformer designs. His five years with the Pittsburgh Transformer Company as assistant chief engineer were occupied with much transformer design. For two years Mr. Uptegraff was consulting engineer for Rutherford & Uptegraff, in which capacity he still acts, and during this time he redesigned and reorganized the transformer department of the Packard Electric Company.

**Box for Exporting Electrical Insulators.**—A new type of crate for shipment of insulators for high-voltage transmission lines has recently been developed by the Forest Products Laboratory of the United States Forest Service at Madison, Wis. The work was done at the request of one of the large manufacturers of electrical goods whose containers had failed to prevent breakage of contents in spite of the apparent strength and durability of the container itself. The redesigned crates were subjected to severe tests and breakage of the insulators was eliminated. Moreover, it was stated, the container proved under test to be 100 per cent stronger, to occupy 15 per cent less space and to save 15 per cent in the cost of material. It is understood that this new type of package will be used to ship thousands of insulators to China for the construction of electric power lines.

## New Advertising Literature

**Exell Manufacturing Company, New Haven, Conn.:** New catalog of ticket punches.

**Hickey & Schneider, Elizabeth, N. J.:** Bulletin No. 11 on high-tension air-break switches.

**Mitchell-Rand Manufacturing Company, 18 Vesey Street, New York City:** A folder cataloging Hope electrical tapes and webbings.

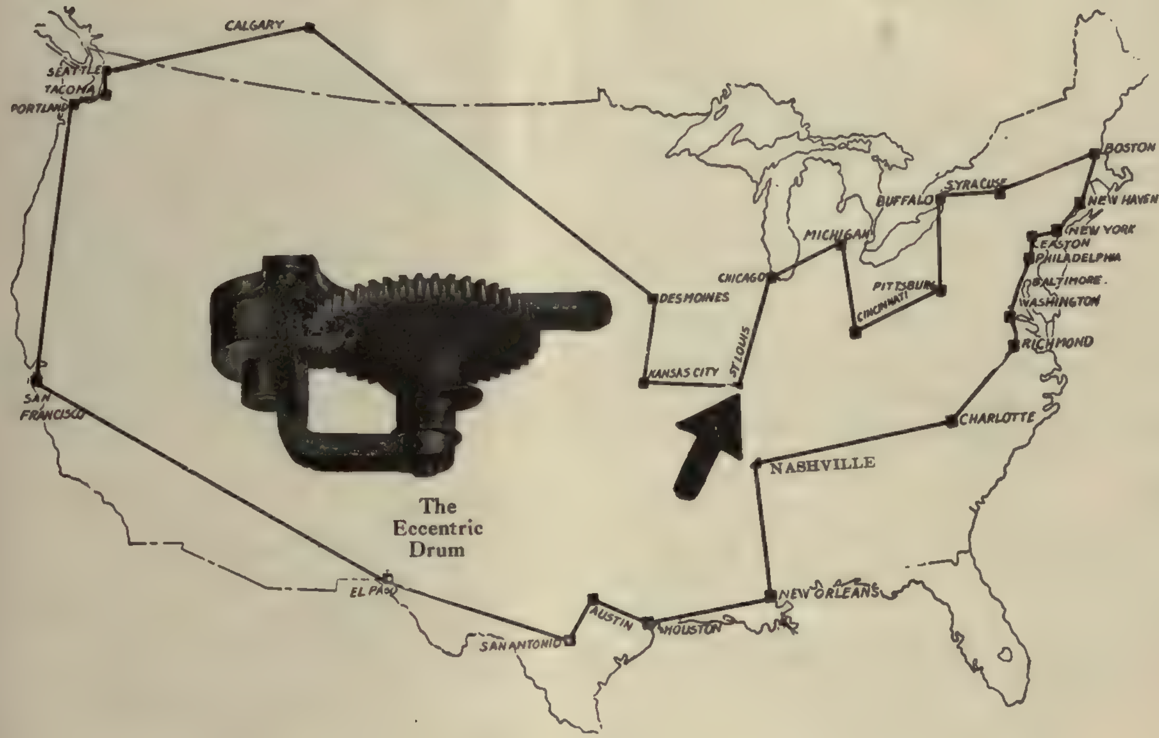
**American Steam Conveyor Corporation, Chicago, Ill.:** Illustrated bulletin on reducing ash-disposal costs, showing a number of typical installations of the steam jet ash conveyor.

**Portable Machinery Company, Inc., Passaic, N. J.:** A twenty-page folder "Over 1000 Scoop Conveyors." Illustrations show the various uses of the conveyors and describe the features of the machines in storing, reclaiming, loading and unloading coal, coke, ashes and other kindred material

**Guaranty Trust Company, New York, N. Y.:** A comparative yield indicator for use in the Victory Liberty Loan campaign. This device enables one to tell at a glance the income value of tax-exempt securities as compared with those subject to the Normal Federal income tax and surfaces of 1919. By use of it the investor can determine, without calculation, the yield which would be required from fully taxable investments to give the same net return as tax-exempt investments.

**Green Engineering Company, East Chicago, Ind.:** A complete catalog covering its stoker and furnace equipment. Besides being well illustrated, this book contains considerable engineering information, including cross-sectional drawings of settings for burning coal under various conditions, tables showing analyses of the coal of the world, information on stoker improvement, with particular reference to rear drums, chain skids, air-sealing systems, "Sealflex" arches and pressure waterbacks.

# Peacock Brakes from Coast to Coast



## In St. Louis, where they operate big, heavy cars

they depend on Peacock Brakes to stop them. Over 150 Peacocks are satisfying the natives of the state whose motto is "Show me!" *We showed them.* We showed them safe, easy operation—brakes that the motormen can depend upon to control the big, crowded cars under exceptionally severe braking conditions. And we showed them ECONOMY—how to keep down brake maintenance costs and keep the cars out of the repair shops. If you're from Missouri on this brake question—and want to be "shown"—and whether you are operating heavy cars or the lightest of "Safeties"—get in touch with us.

*Next Stop* — CHICAGO

## National Brake Co.

Buffalo, N. Y.

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**Ford, Bacon & Davis,**
Engineers.
115 BROADWAY
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THE J. G. WHITE COMPANIES
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK
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**STONE & WEBSTER**
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
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**JOHN A. BEELER**
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

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ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

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CONSULTING AND CONSTRUCTING ENGINEERS
*Valuations Reports Investigations*
*Designs Construction Management*
60 BROADWAY, NEW YORK
CLEVELAND, OHIO YOUNGSTOWN, OHIO
Illuminating Bldg. Mahoning Bank Bldg.

**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
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**WOODMANSEE & DAVIDSON ENGINEERING CO.**
ENGINEERS
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**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

**ENGELHARDT W. HOLST**
*Engineer*
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PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

# Thermit at Los Angeles

## *Welds that Hold*

This scene on South Main Street between Thirtieth Place and Slauson Avenue (3 miles), Los Angeles, is one of several important Thermit Weld installations in that busy and beautiful city.

This particular installation was made in 116 lb. girder rail of 3 ft. 6 in. gage in 1913.

While not of the later Insert Weld type, the Thermit Welds in this work are giving excellent service as evident from the absence of trouble reports. No news in such cases is good news.

The Thermit Insert type of Weld we know will give you still better service in attaining.

A Truly Continuous Rail.

**METAL & THERMIT CORPORATION**

**Successors to Goldschmidt Detinning Co. and the Goldschmidt Thermit Co.**

**120 BROADWAY, NEW YORK**

**329-333 Folsom St., San Francisco**
**15 Emily St., Toronto, Ont.**
**7300 So. Chicago Ave., Chicago**
**1427-1429 Western Ave., Pittsburgh, Pa.**
**Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.**

# "The Bird of Time has but a little way To flutter—and the Bird is on the Wing"

Your past business history is written. Nothing that you may do now can alter it.

Your present business condition is the result of your past business acts. They, too, are beyond change. You must accept the present conditions, bad or good.

Your business future depends upon present influences. Future business will be bad or good as the result of what you do now.

You can shape the future to insure your business success and stability.

If you drift you must be satisfied with whatever seas surround you hereafter.

If you wish to steer to Prosperity you must plot your course now and keep on it.

The cheapest, surest aid in shaping future business prosperity is constant and conspicuous advertising.

Present conditions are not a factor in determining actions designed to influence the future.

If you value your business future you will value present advertising.

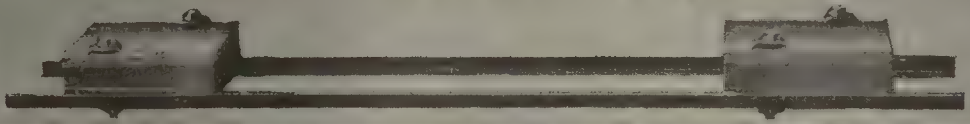
**The Electric Railway Journal covers all departments of the industry—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.**

## Electric Railway Journal

**Member Audit Bureau of Circulations**
**Member Associated Business Papers, Inc.**

**Tenth Ave. at 36th St., New York**

# The MECHANICAL RAILWAY TIE



## Low Cost to Install No Cost to Maintain DAYTON Mechanical Ties

Briefly, the ties are attached to the rails—rails blocked to level—and concrete poured exactly as in ordinary paving. Untreated wooden ties, completely installed, including labor charges, with gravel ballast, cost 6% more than Dayton Mechanical Ties for the same length of track. At the end of ten years they cost more than double your Dayton Ties!

Dayton Mechanical Ties form a rigid, reinforced concrete bed. **Yet each tie** rests on its own highly **resilient cushion** of asphalt under the wooden-block rail support. A special form of tie insures against low and uneven joints.

*Better economy dictates*
*your inquiry to us today.*

*Order One for Trial and Be Convinced*

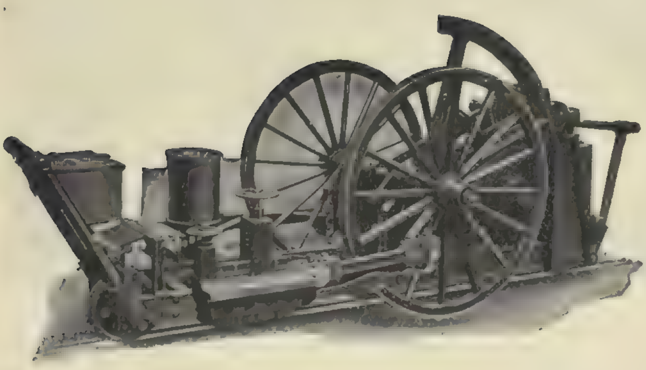
**THE DAYTON MECHANICAL TIE CO.**
**201 Third Street Arcade**
**DAYTON, OHIO**

Differences in height of rails at joints must be removed immediately to conserve the life of the joint. Practice has demonstrated this very forcibly within the last eight years, and I will mention one particular instance out of many where the issue was brought to my attention. Two pairs of compromise splices were installed of the Atlas type where 70-lb. A. S. C. E. rails were connected to 97-lb. 424 grooved section. At the time of installation in 1913 a very slight difference in the surface of the rails was noticed, and we neglected to grind the rails to a smooth surface. This was a single track over which 26-ton cars operated on a headway of from three to four minutes. *Inside of eight months these joints were a wreck, including paving and rail ends.* In order to repair them, new Atlas plates were installed, new pieces of rails were cut in, *and the joints were then ground to a true surface.* After more than two years these joints are apparently as perfect as on the day they were installed. We find this to be particularly true on compromise joints at special work.

*From a report of the track superintendent of a large electric railway*

# The Proven Case

# The Reciprocating Track Grinder



has *proven* its value to the electric railway industry.

That proof has been given in such cases as the one cited above. It has been given in cases where stretches of track were in such bad condition from corrugations and cupped joints that replacement seemed the only remedy and the Recipocrating Grinder restored the rail to useful service. It has been given in cases where other types of machines had been tried and found unsatisfactory.

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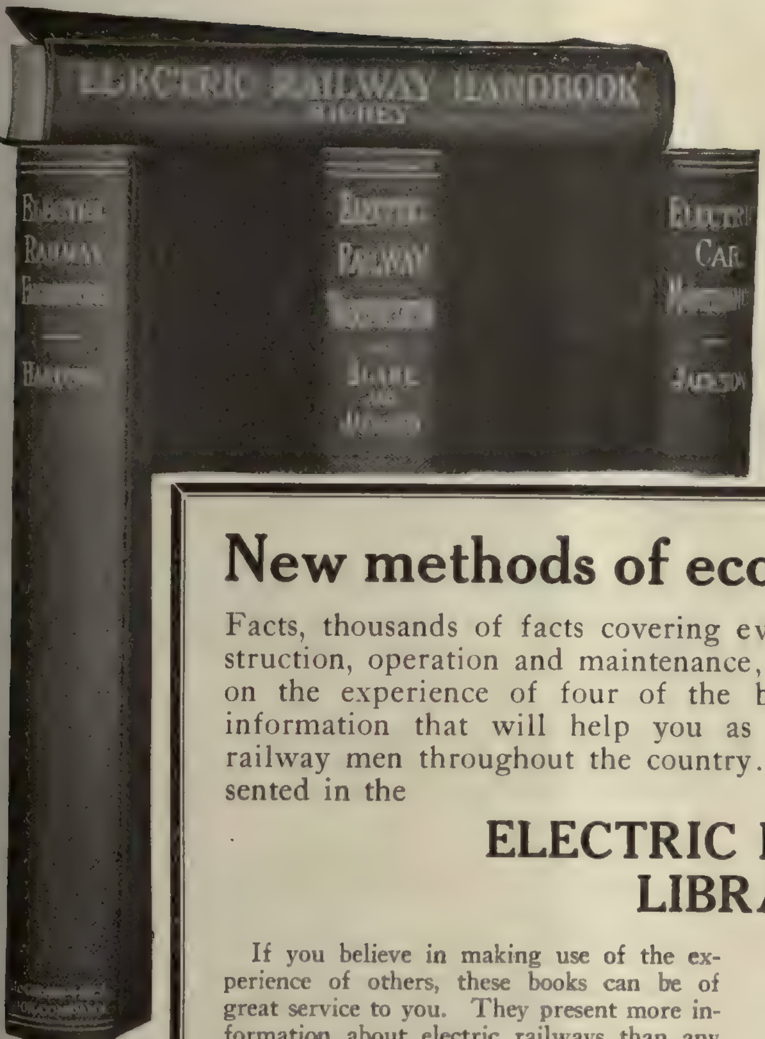

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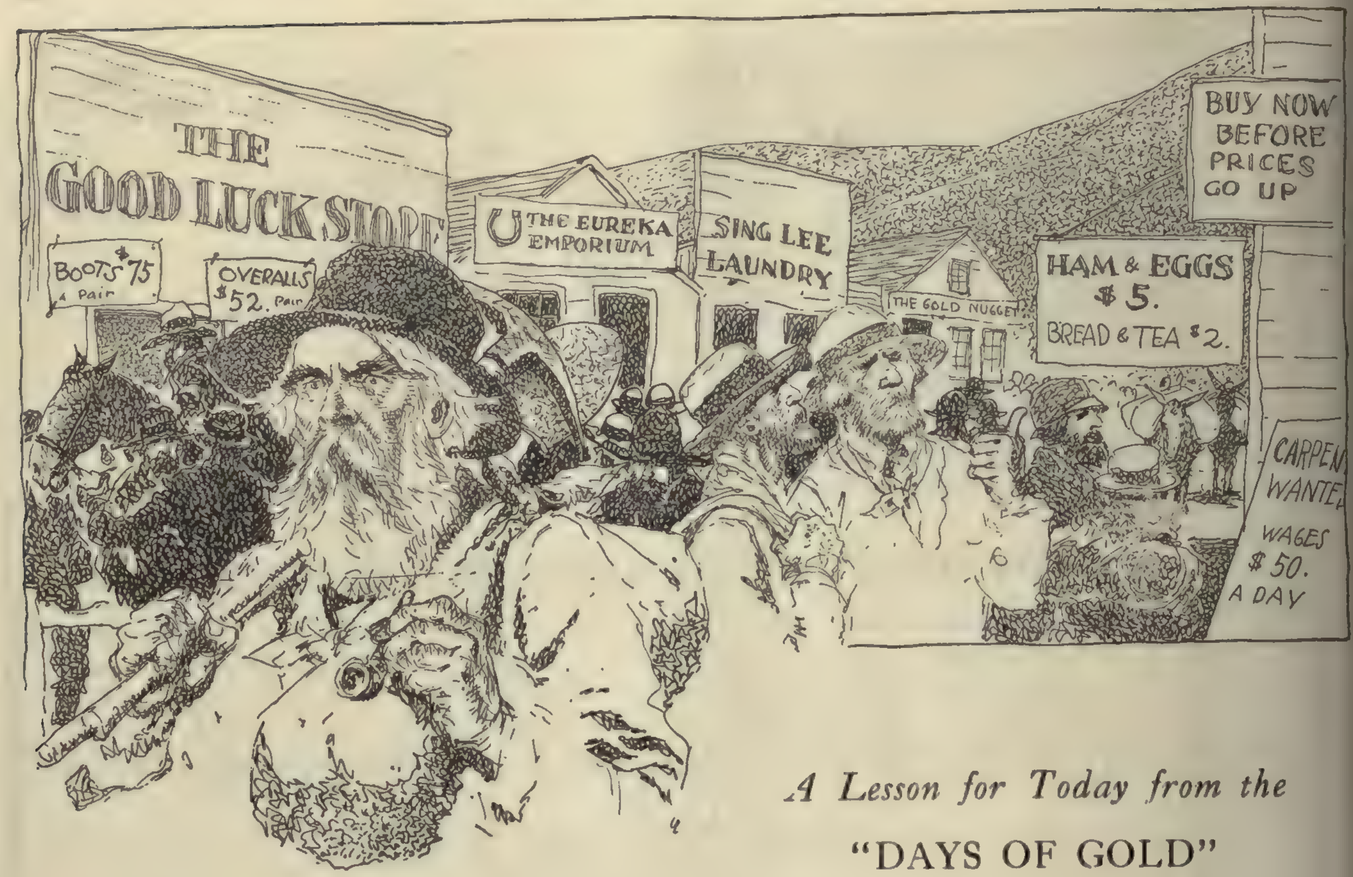

## *A Lesson for Today from the*

## "DAYS OF GOLD"

IF YOU will read your history of California in the gold rush days of '49, you will find that one of the outstanding and most impressive features of the time was "high prices." You will find many amusing instances of the astonishment of the newly arrived tenderfoot at the prices he was obliged to pay for everything he needed or desired. A plate of ham and eggs, $5.00; a pair of boots, $75.00; a bit of lumber, $100.00; carpenters' wages, $50.00 a day, and so on through the whole list of "the market."

The chief reason for this condition in the gold fields in '49 was precisely the fundamental reason for our general high level of prices all over this country and the civilized world today, a relatively large supply of currency, a relatively small supply of goods or commodities, a great need of commodities.

Under the call of the prices which California was offering for commodities in those days of gold, all the world began rushing its surplus products to that profitable market.

The production of gold, however, was so great as to keep far ahead of the production of commodities, and it was only after a period of years that commodity prices in California came to a level approximating those of older markets.

On the other hand, California was shipping gold to the older markets so rapidly that commodity prices rose in those markets to greatly higher levels.

In the last four and half years the whole civilized world has been *destroying commodities* and *increasing currency*. Naturally, the prices of commodities measured in currency have gone up and the price of currency measured in commodities has gone down.

The economic history of the world clearly shows that in all similar circumstances the decline of commodity prices has been a *much slower* process than currency inflation, and in no case in modern history has the level of commodity prices ever returned to the level at which it stood when the inflation of the currency began.

One of America's highest economic anthorities, Professor Irving Fisher, of Yale University, says in his paper read at the Conference of Governors and Mayors at the White House March 3rd to 5th, "Business men should face the facts. To talk reverently of 1913-14 prices is to speak a dead language today. * * * We are on a new high price level which will be found a stubborn reality."

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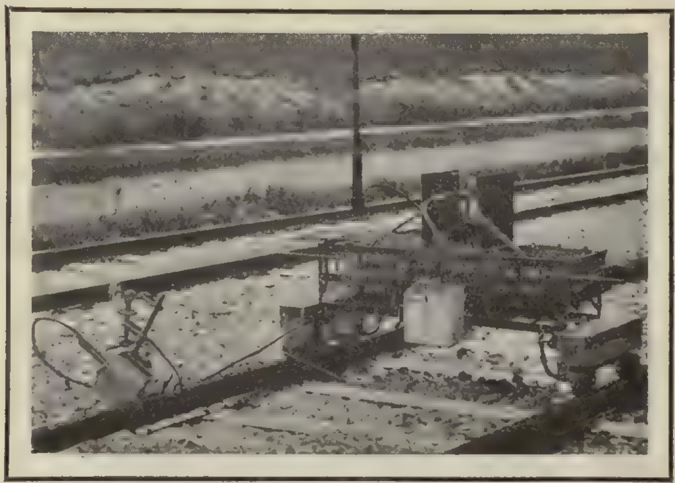

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| 8-J | 6 lbs. | 6 lbs. | ½ inch |
| 9-J | 7 lbs. | 7 lbs. | inch |
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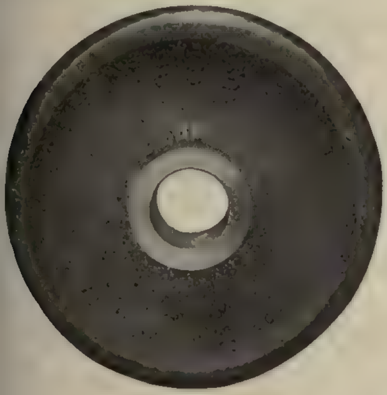

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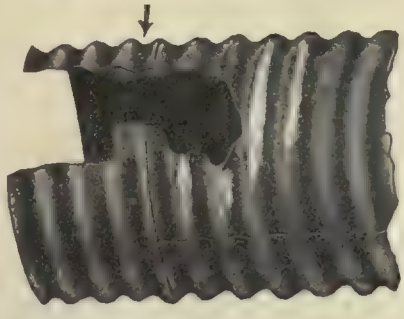

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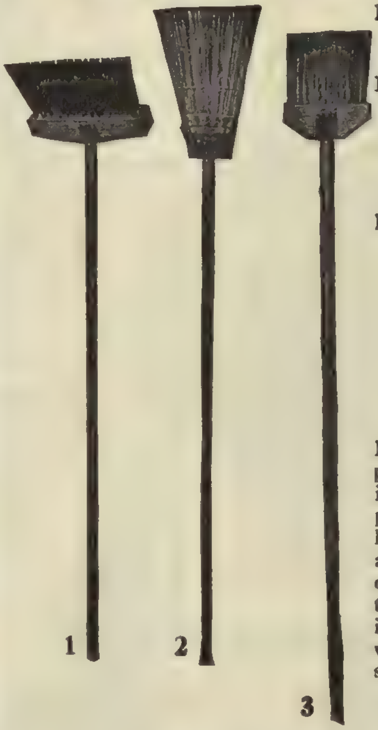

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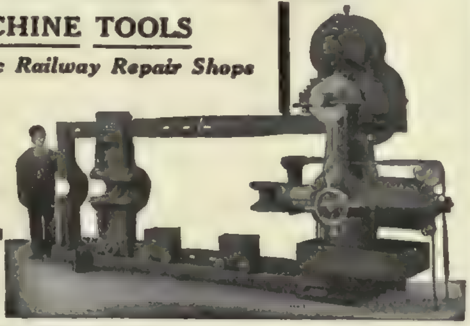

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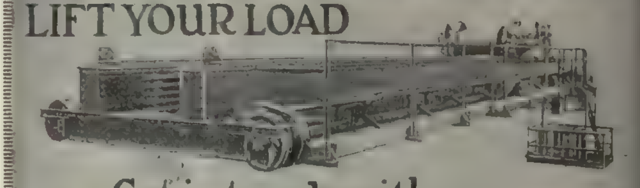

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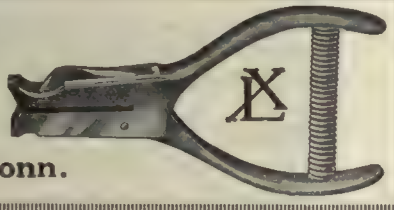

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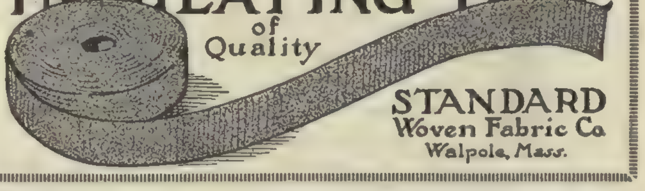

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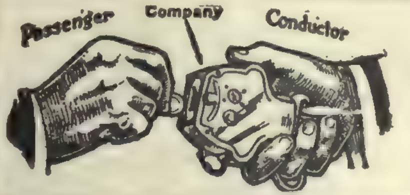

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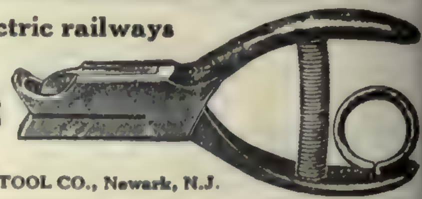

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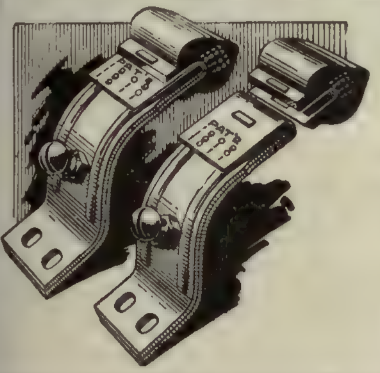

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Armature Babbitt Metal is unusually long wearing and eliminates the tremendous expense of frequent rebabbitting.

Designed particularly for electric railway armature bearing service, and recognized the world over for unexcelled quality.

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was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

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Some other reader may have just what you want—and he may be in the market for the items you wish to turn into cash.

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Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information

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COMPETENT car barn man wanted to care for eight small cars, repair overhead lines and with some knowledge of track repair work. State age, experience and salary expected in first letter. P-398, Elec. Ry. Journal, Philadelphia.

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AUDITOR, comptroller, broad experience in finances and accounting with large utility interests, both railway and lighting; competent executive and organizer. References and business history upon request. PW-392, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

SUPERINTENDENT or master mechanic position wanted, small road. Have had wide experience on maintenance and construction; held similar positions; A-1 references. PW-399, Elec. Ry. Journal, Philadelphia.

INSTRUCTION expert, twelve years experience, would like change; possibly I can show your men how to become more efficient, resulting in voluntary coöperation, better relation with the public and the prevention of accidents. PW-400, Elec. Ry. Journal.

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### PUBLIC UTILITY MANAGER

Sound business judgment. Demonstrated ability in public relations. Salary $10,000. Replies treated as confidential.

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ELECTRICAL, mechanical or executive employment suitable for married man with technical knowledge, mechanical skill, business training and refinement. Broad experience as machinist and factory electrician and as steam engineer, electrical engineer, superintendent and manager of electric light and railway properties. Efficiency or research work preferred but any suitable immediate employment considered. Best of references. Address "Industry," Mauch Chunk, Pa.

POSITION as general freight agent with electric line; have had 15 years' experience as general express and freight agent; can furnish best of references. George Dimford, 59 Marshall St., Rochester, N. Y.

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**5-10 Bench Open Cars For Sale** (Bulkhead), with or without equipment. P. O. Box No. 746, Foxboro, Mass.

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- 2—K-6 and 2—K-10 G. E. Controllers, in good operating condition.
- 1—Drew Electric Shovel, suitable for gravel bed.
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- 1—Set Triplex Falls Yale & Towne make, Model 1898, 1-ton capacity.

### FOR SALE

- 1—Buckeye Electric Blueprinting Machine.
- 10—W. E. & M. Co. Type 250-C Switch Groups, in good operating condition.
- Various Repair Parts (New), G. E. Type M Control.
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### 4 Wason Paye Cars

28 ft. over corner posts
Standard O-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

### 1—G. E. MOTOR GENERATOR SET

Motor is 6-pole, shunt wound, rated at 400 amperes, 515 volts, 450 r.p.m.. Generator is 8-pole compound wound, rated at 1920 amperes, voltage 90 to 115 capacity, 450 r.p.m.

*This set is complete with starting box for motor, reversible field rheostat for generator, also necessary switch gear.*

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Chicago Elevated Railroads
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Everything For
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**15,000 TONS—NEW and RELAYERS**

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**RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.**

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and loss carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

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On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc **Remember our initials stand for our product.**

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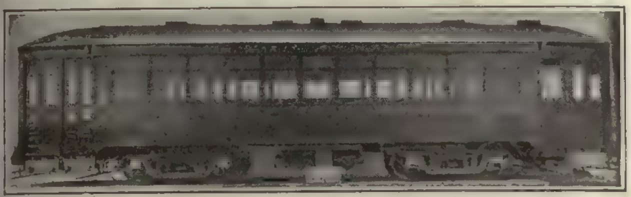

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10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

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550 v., D. C., Substation complete with transformers (11,000 v.-387 v.), switchboard, lighting arresters, choke coils, etc.

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3—100 kw. 60 cy., 11,000 v. to 2300 v. Westinghouse oil cooled transformers.

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Oxweld Acetylene Co.

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**Air Rectifiers**
Holden & White, Inc.

**Anchors, Guy**
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Holden & White, Inc.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
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International Register Co., The

**Batteries, Storage**
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Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
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Green Engineering Co.

**Brooms, Track, Steel or Rattan**
Paxson Co., J. W.
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**
General Electric Co.
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Bemis Car Truck Co.
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Electric Service [illegible] Co.
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Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Rome Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**
International Register Co., The

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
General Electric Co.
Westinghouse Trac. B. Co.

**Concrete Mixers**
Blaw-Knox Co.

**Condensers**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Connectors, Solderless**
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
Eureka Co.
Trigger Lock Reversible Controller Finger

**Controllers or Parts**
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conveyors Belt**
Portable Machinery Co.

**Conveyors, Coal & Ash**
Portable Machinery Co.

**Conveyors, Portable**
Portable Machinery Co.

**Conveying and Hoisting Machinery**
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works.

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

**Couplers, Car**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Cranes**
Toledo Bridge & Crane Co., The

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Culverts**
Armco Iron Culvert & Flume Mfgrs. Assn.
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutting Apparatus, Oxy Acetylene**
Milburn Co., The Alex.
Oxweld Acetylene Co.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.,
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Works)**
Cleveland Frog & Crossing Co.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, Inc., P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Chicago Pneumatic Tool Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., Inc., H. M.
Ford Bacon & Davis
Holst, Englehardt W.
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**
Westinghouse Elec. & Mfg. Co.

**Fabricated Steel**
Blaw-Knox Co.

**Fare Boxes**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.
Page Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Electric Service Supplies Co.
Star Brass Works.

**Fibre and Fibre Tubing**
Westinghouse Elec. & Mfg. Co.

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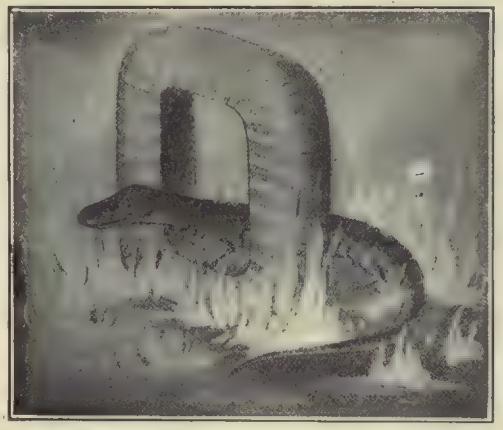

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**Field Coils.** (See Coils)

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.

**Forgings**
Carnegie Steel Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track.** (See Track Work)
**Furnaces.** (See Stokers)

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**
Columbia M. W. & M. I. Co.
General Electric Co.

**Galvanizing**
Cattie, Jos. P., & Bros.

**Gaskets**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Carnegie Steel Co.
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Railway Appliance Co.
Nuttall Co., R. D.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs.** (See Bells and Gongs)

**Graphite**
Morgan Crucible Co.

**Greases.** (See Lubricants)

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.
Indianapolis Frog & Switch Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

**Hose, Bridges**
Ohio Brass Co.

**Hose, Pneumatic and Fire**
Westinghouse Traction Brake Co.

**Hydraulic Machinery**
Niles-Bement-Pond Co.

**Inspection**
Electrical Testing Lab's.

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

**Insulation.** (See also Paints)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Insulators.** (See also Line Material)
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks.** (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Lackawanna Steel Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

**Joints, Rail**
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joints Co.
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., J. G.

**Laboratory**
Electrical Testing Lab's.

**Lamp Guards and Fixtures**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent.** (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Ohio Brass Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lighting Regulators, Car**
Holden & White, Inc.

**Lights, Portable Carbide**
Milburn Co., The Alex.

**Lightning Protection**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material.** (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Locomotives, Electric**
Brill Co., The J. G.
General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.

**Lumber.** (See Poles, Ties, etc.)

**Machine Tools**
Columbia M. W. & M. I. Co.

**Machine Work**
Columbia M. W. & M. I. Co.
Holden & White, Inc.

**Meters, Car, Watt-Hour**
Economy Electric Devices Co.

**Meters.** (See Instruments)
Electric Service Supplies Co.
Wood Co., Chas. N.

**Mirrors for Motormen**
Drew Elec. & Mfg. Co.

**Motors, Electric**
Westinghouse Elec. & Mfg. Co.

**Nuts and Bolts**
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

**Oils.** (See Lubricants)

**Oxy-Acetylene.** (See Cutting Apparatus, Oxy-Acetylene)

**Packing**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Paints and Varnishes.** (Insulating)
Mitchell-Rand Mfg. Co.

**Paints and Varnishes for Woodwork**
National Ry. Appliance Co.

**Paving Bricks, Filler and Stretcher**
Nelsonville Brick Co.

**Paving Material**
Am. Brake Shoe & Fdy. Co.
Nelsonville Brick Co.

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions.** (See Gears)

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Pipe**
National Tube Co.

**Pipe Fittings**
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

**Planers.** (See Machine Tools)

**Pliers, Insulated**
Electric Service Supplies Co.

**Plywood, Waterproof Moulded**
The Haskelite Mfg. Corp.

**Pole Reinforcing**
Hubbard & Co.

**Pole Sleeves**
Drew Elec. & Mfg. Co.

**Poles and Ties, Treated**
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles Metal Street**
Bates Expanded Steel Truss Co.
Hubbard & Co.

**Poles Ties Posts Piling and Lumber**
Carney & Co. B. J.
Lindsley Bros. Co.
Page & Hill Co.
Southern Cypress Mfrs. Assn.
Valentine-Clark Co.
White Marble Lime Co.

**Poles Trolley**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

**Poles, Tubular Steel**
National Tube Co.

**Power Saving Devices**
Arthur Power-Saving Recording Co.
Economy Electric Devices Co.

**Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Punches, Ticket**
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

**Purifiers, Feed Water**
Scaife & Sons Co., Wm. B.

**Rail Grinders.** (See Grinders)

**Railway Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Rail Welding.** (See Brazing and Welding Processes)

**Rails, Steel**
Carnegie Steel Co.

**Rails, Relaying**
Zelnicker, Walter A., Supply Co., Inc.

**Rattan**
Brill Co. The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Recorders, Power Saving**
Arthur Power-Saving Recorder Co.

**Registers and Fittings**
Brill Co., The J. G.
Electric Service Supplies Co.
Exell Mfg. Co., The
International Register Co., The
Rooke Automatic Register Co.

**Reinforcement, Concrete**
American Steel & Wire Co.
Carnegie Steel Co.

**Repair Shop Appliances.** (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work.** (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley.** (See Catchers and Retrievers, Trolley)

**Rheostats**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Sanders, Track**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Cleveland Fare Box Co.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car**
Brill Co., The J. G.

**Sash Metal, Car Window**
Hale & Kilburn Corp.

**Scrapers, Track.** (See Cleaners and Scrapers, Track)

**Seats Car.** (See also Rattan)
Brill Co., The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

**Second-Hand Equipment**
Archer & Baldwin
Cleveland Armature Wks.
Duquesne Elec. & Mfg. Co.
Electric Equipment Co.
Exell Mfg. Co., The
Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Shades, Vestibule**
Brill Co., The J. G.

**Shovels**
Hubbard & Co.

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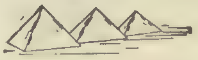

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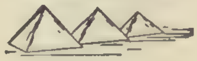

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**Signals, Car Starting**
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Electric Service Supplies Co.
National Pneumatic Co., Inc.

**Signal Systems, Block**
Electric Service Supplies Co.
Federal Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus (See Welding Processes and Apparatus)**

**Spikes**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds**
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves. (See Clamps and Connectors)**

**Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

**Sprinklers, Track and Road**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Steel Forms**
Blaw-Knox Co.

**Steps, Car**
American Mason Safety Tread Co.
Universal Safety Tread Co.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

**Storage Batteries. (See Batteries, Storage)**

**Strand**
Roebling's Sons Co., J. A.

**Straps, Car, Sanitary**
Holden & White, Inc.

**Structural Iron.. (See Bridges)**

**Superheaters**
Babcock & Wilcox Co.
Locomotive Superheater Co.
Power Specialty Co.

**Sweepers, Snow. . (See Snow Plows, Sweepers and Brooms)**

**Switch Stands**
Indianapolis Switch & Frog Co.
Ramapo Iron Works

**Switches, Lock**
Weiss Switch Lock Co.

**Switches, Track. (See Track Special Work)**

**Switches and Switchboards**
Anderson Mfg. Co., A. & J. M.
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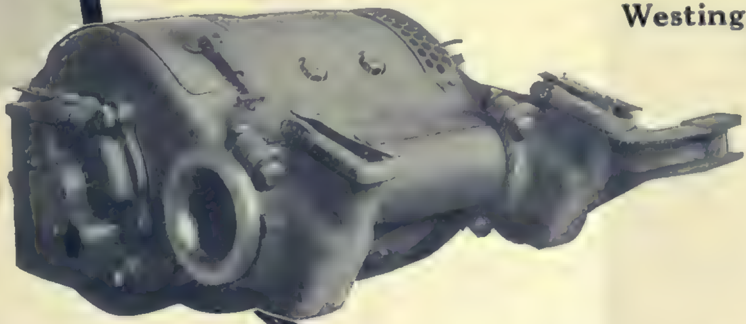

**Westinghouse Electric & Manufacturing Co.**
East Pittsburgh, Pa.

W
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# Westinghouse

*Vol. 53, No. 20* New York, May 17, 1919 ***Pages 945 to 990***

# Electric Railway Journal

H. W. BLAKE, *Editor*

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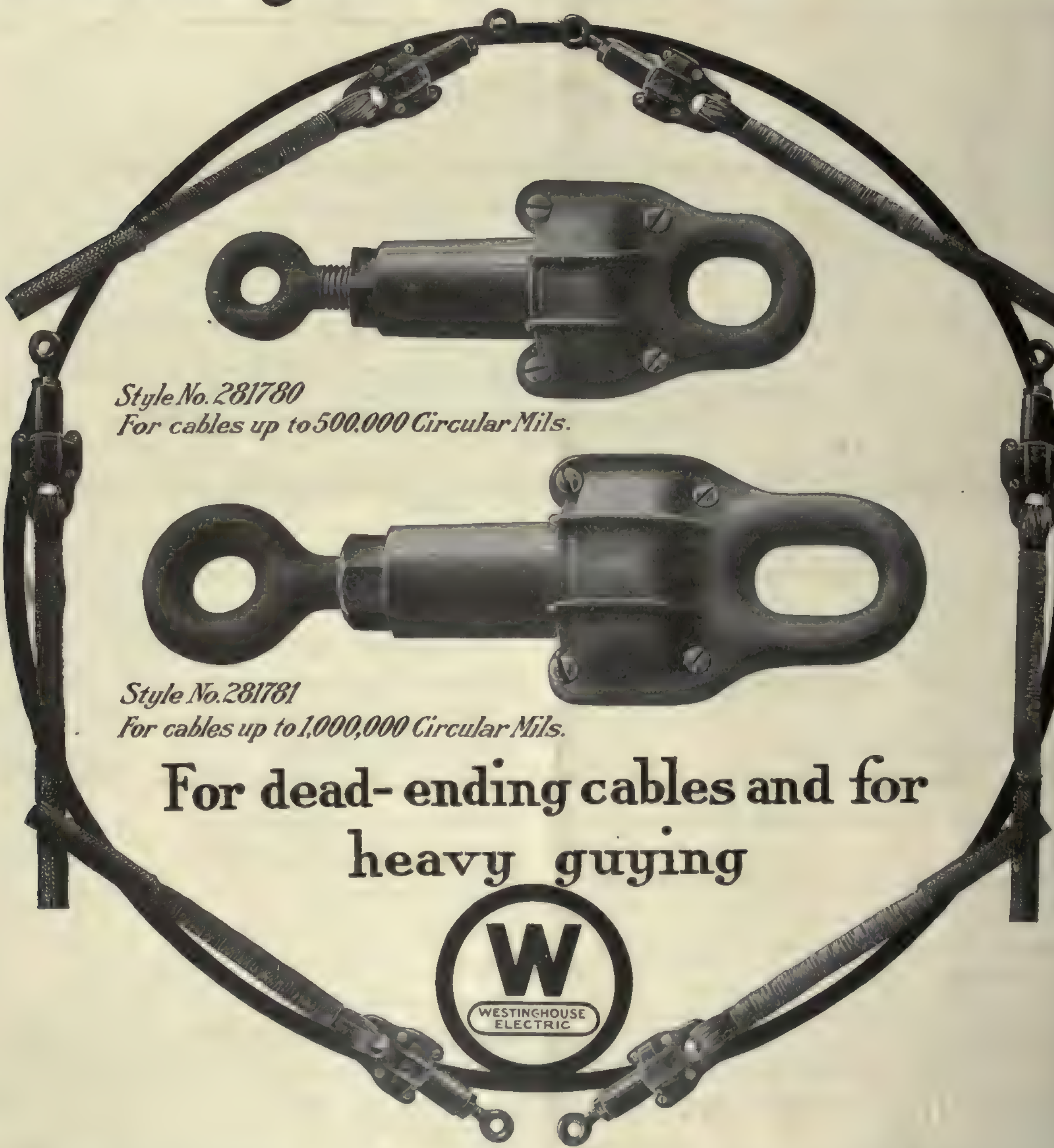

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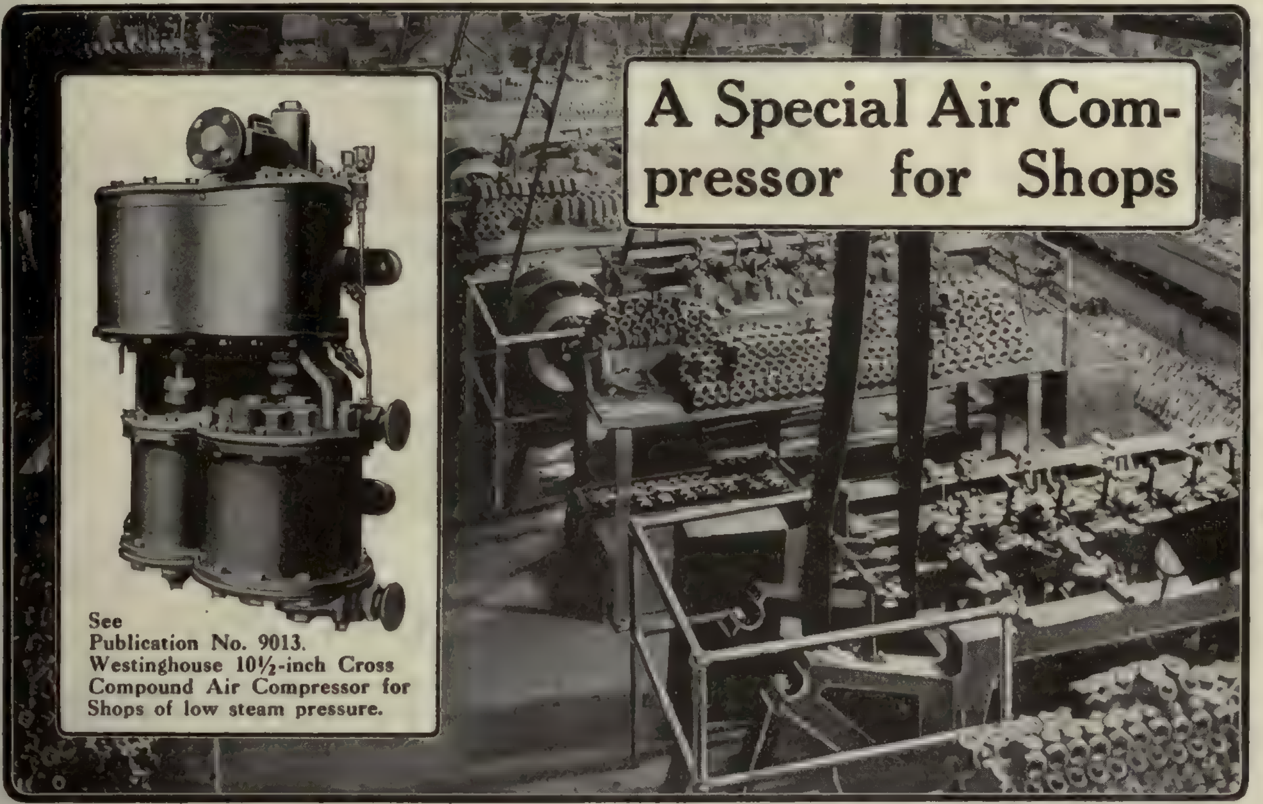

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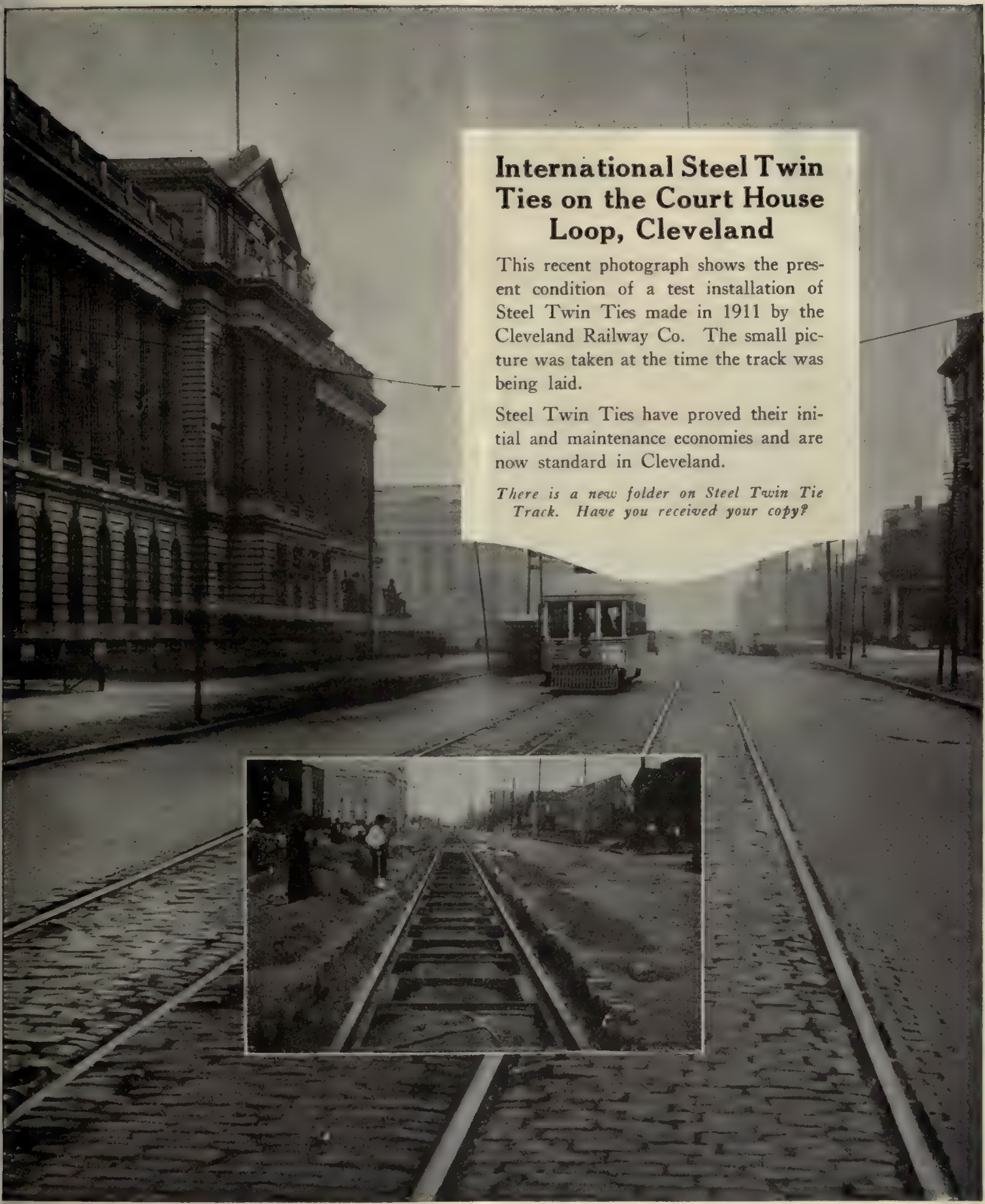

## International Steel Twin Ties on the Court House Loop, Cleveland

This recent photograph shows the present condition of a test installation of Steel Twin Ties made in 1911 by the Cleveland Railway Co. The small picture was taken at the time the track was being laid.

Steel Twin Ties have proved their initial and maintenance economies and are now standard in Cleveland.

*There is a new folder on Steel Twin Tie Track. Have you received your copy?*

# The International Steel Tie Company

**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

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Imperials are sturdy, trouble-proof, reliable and require far less care than their effectiveness justifies.

***Shall we arrange a demonstration on your road?***

**The Ohio Brass Company, Mansfield, Ohio**

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco

*Exclusive Sales Agents in U. S. for Crouse-Hinds Imperial Headlights.*

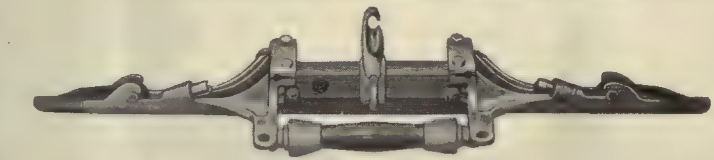
OB PRODUCTS

*Quality First*

Trolley wire is held by serrated chucks. The greater the strain the tighter the chucks grip.

The tension is carried by two 1¼-in. wood strains in the same plane as the trolley. Pull-offs are also in the same plane. Buckling and tilting are prevented.

O-B Type A FORM 3 Section Insulator. Patented



Page 397, Catalog No. 17

Two O-B Section Insulators Combining Simplicity, Strength and Endurance

Installation is speedy and easy because O-B Cam Tips are used. These approaches do away with loose bolts and small parts.

Fibre runner piece has bronze retaining clips which take the arc. Runner and clips are a unit held by two bolts. Easily removed and replaced. Adequate provision has been made in both types to prevent warping of runner.

Either type may be installed directly on the span wire, or the yoke can be removed and an insulated hanger screwed directly to the device.

And either type goes up on the line to stay, to do its duty steadily and long.

**The Ohio Brass Company, Mansfield, Ohio**

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco

O-B Type C Section Insulator. Patented.

Page 398, Catalog No. 17

Trolley wire is held at each end by two husky U bolts which grip the wire without weakening it.

It is a sturdy, strong device a little lighter and a little less expensive than the double beam Type A Form 3.

# Philadelphia is not slow

to adopt the trolley wire that stays up the longest. The same progressive management that has introduced many improvements in service and equipment uses many miles of Phono-Electric because it outlasts copper several times.

**Bridgeport Brass Company**
**Bridgeport Connecticut**

# What the Bond Tester Revealed

## The Company Has Been Losing Four or Five Dollars Per Year on This Joint

Only *one* joint. Five dollars per joint to overcome the resistance of a badly-bonded track return. A small resistance of 1/1000 ohm per bond can waste that much power per bond.

## "PROTECTED" Rail Bonds

have been on the market since the beginning of modern electric railway development. They are designed to meet successfully every bonding condition.

Besides the feature of the "Shot-Over" sleeve which prevents breakage at the most vital point—at the point of emergence of the copper strands from the terminal—"Protected" Rail Bonds form a perfect electrical contact that is proof against moisture, vibration, and all severe operating conditions.

Our catalog of "Protected" Rail Bonds goes thoroughly into the subject of bonding. Write for your copy to-day.

**ELECTRIC SERVICE SUPPLIES Co.**

***Manufacturer of Railway Material and Electrical Supplies***

**PHILADELPHIA**
**17th and Cambria Streets**

**PITTSBURGH**
**337 Oliver Building**

**NEW YORK**
**50 Church Street**

**CHICAGO**
**Monadnock Building**

**Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.**

# Replace Your Worn Center Bearings with Hartman

**Raceways That Don't Pit**

**Increase Life of Wheels**

**Will Fit Almost Any Truck**

**Are Self-Centering**

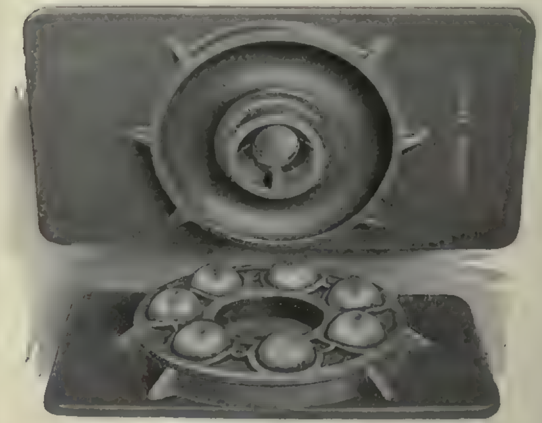
**No Lubrication Needed**

**Send for dimension sheets and Catalogue No. 10. We can tell from the former how to supply you with proper bearings for ready application.**

Undoubtedly you have cars with worn center bearings—either plain or anti-friction. Why not try out some Hartman self-centering plates on these cars?

You will find that they about double the life of wheels, cutting in half the cost of renewals and removals for grinding. They reduce truck nosing and decrease power consumption on curves. The shape of the raceways prevents pitting and the balls are 2⅛ inches in diameter, made of forged steel.

Combined with Perry anti-friction side bearings they give you ideal truck operation. Or they can be used with ordinary friction side plates,



**Put Them On Your *Old* Cars**

## Holden & White Inc.

**Electric Railway Distributors for The Joliet Railway Supply Company**

**817 Fisher Building, Chicago**

National Rwy. Appliance Co., New York, Washington; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles; L. Brandenburger, Salt Lake City; Holden & White, Inc., Detroit.

# WESTERN RED CEDAR POLES

## Meeting Modern Service Demands

Engineers in every section of the North American Continent are finding that the Strong, Straight, Sightly Western Red Cedar Poles fill every requirement of modern service lines.

Picture 1 shows the main feed lines from the power plant of the Little Rock Railway and Electric Company, of Little Rock, Arkansas. This line is built of Western Red Cedar Poles and supplies Camp Pike, eight miles distant.

No. 2 shows a 40-ft., 8-inch top Western Red Cedar Pole replacing a Chestnut pole in the lines of the Merchants Heat and Light Company at Indianapolis, Indiana.

No. 3 shows 35 ft., 8 inch top, Butt-Treated Western Red Cedar Poles forming one of series of switch racks of the Otter Tail Power Company of Minnesota. The switch shown here is at Herman, Minnesota.

Note the straight, sightly line of these poles.

**Western Red Cedar Association, Peyton Building, Spokane, Washington**

*Butt-Treat your poles for added life—Ask your dealer for information*

# *CHOOSE!*

## The Reciprocating Track Grinder

has clearly and completely shown its ability to greatly prolong the useful life and service of track.

The only alternative to the consistent use of a Track Grinder for eliminating corrugations and cupped joints is the relatively early replacement of track.

The great economy of track grinding as compared with the loss of years of track service makes the choice easy.

And that is to say nothing of the saving in the decrease of wear and tear on rolling stock and the general advantages which accompany smooth, well maintained track.

**RAILWAY TRACK-WORK COMPANY**

**30th and Walnut Streets, Philadelphia**

*Elreco Tubular Poles combine lowest cost, lightest weight, least maintenance, greatest adaptability*

# The ELRECO Tubular Pole

## Is the Safest and the least Cumbersome

IN cities where sidewalk space is valuable there is demand for the pole that occupies the smallest ground area. When this fundamental—the smallest ground area—is compounded by many other points conceded to be meritorious, you have the specifications written for Elreco Tubular Steel Poles.

Children cannot climb them.

Teamsters cannot readily use them for a hitching post.

They offer slight opportunity for hubs of vehicles to engage them in passing.

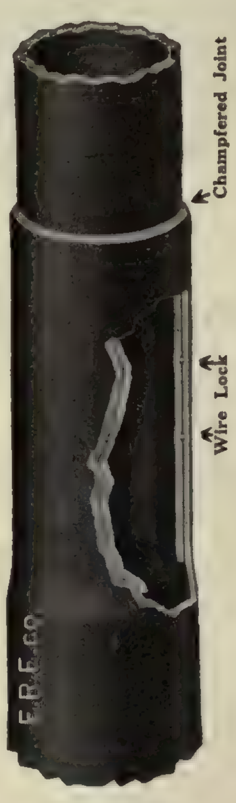
They offer unexcelled ease in painting.

They surpass every other form and shape of pole in uniformity and in their ability to withstand strains in all directions.

An Elreco Tubular Pole occupies but 34½ sq. in. at the ground line. For your own edification, compare these figures with those of poles other than Tubular.

These are but a few of the many reasons why Elreco Poles have been used so extensively by leading street railways throughout the world. In theory as well as in practice, these poles are conceded to be rightly designed. Likewise they are the safest and the most serviceable.

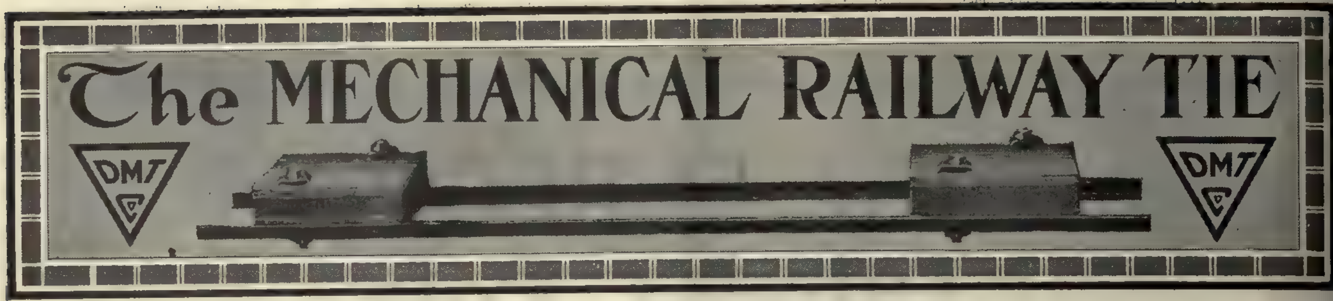
Let us have your inquiries for your present and future requirements.



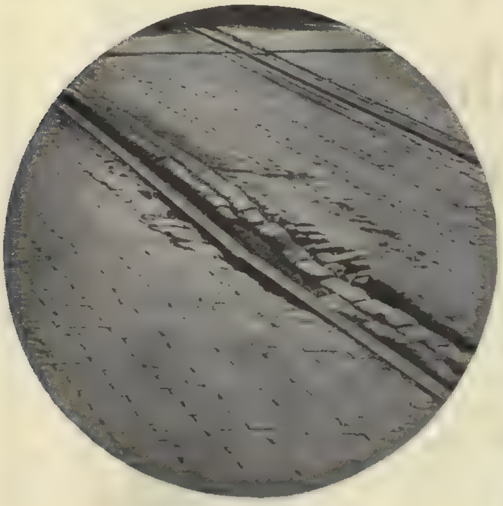
**Observe the WIRE LOCK**

## Electric Railway Equipment Co.

Cincinnati, Ohio
New York: 30 Church Street

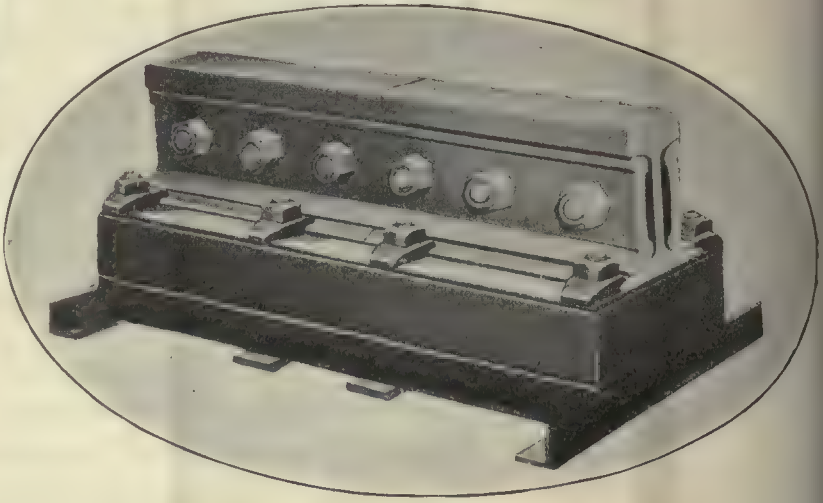


The MECHANICAL RAILWAY TIE



What's the Answer?

Here is a "terrible example" of joint failure. The rails are low and uneven. It looks *hopeless*. What's the answer to the question of how to rehabilitate that joint quickly and at lowest cost?



The Answer Is to Install The Efficient

Dayton Rail Joint Booster

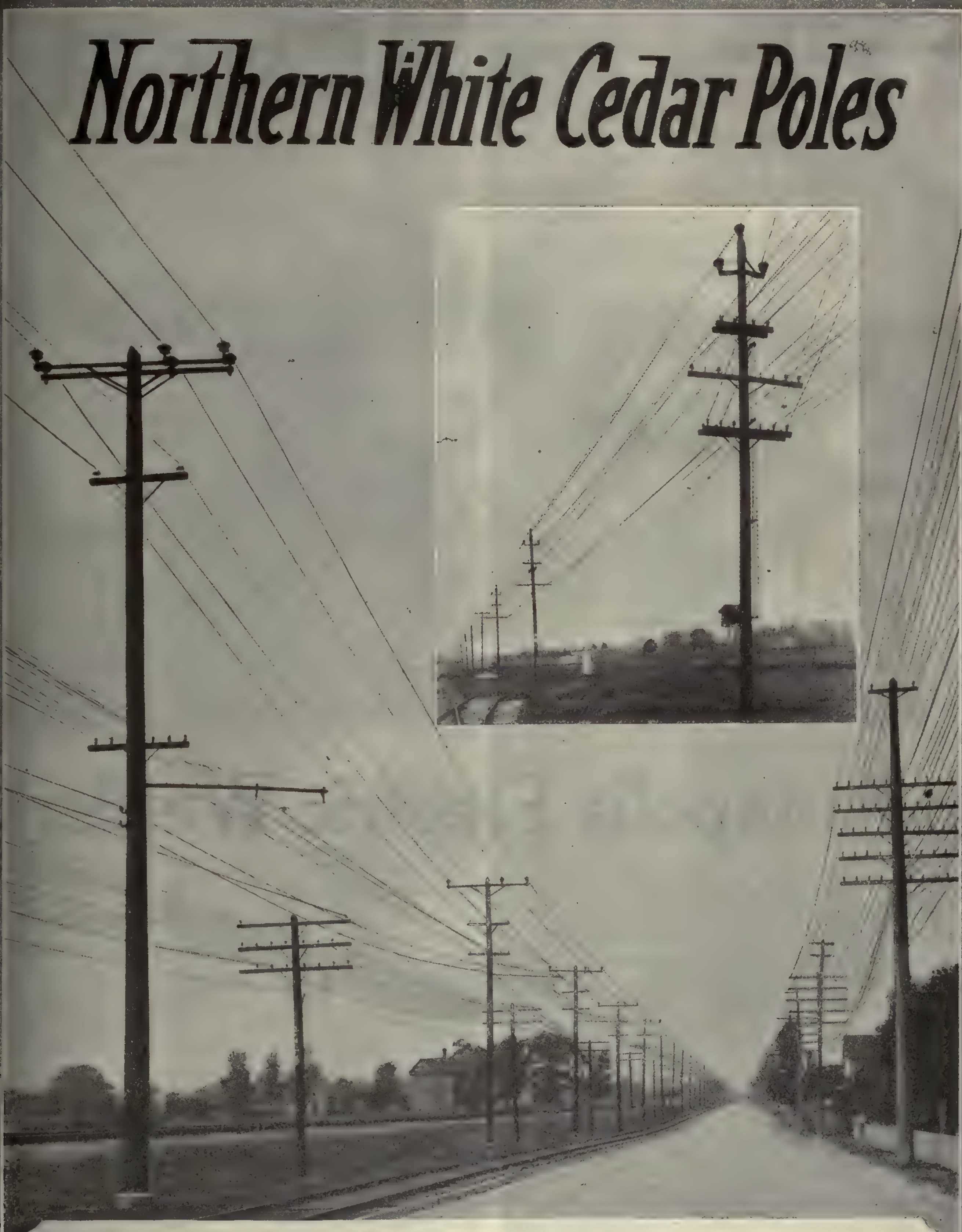
With this Joint Booster low joints are repaired and rail ends brought to surface quickly with comparatively small cost and without in any way interrupting car operations. Their installation is simple.

The Dayton Rail Joint Booster is an adaptation of the Dayton Mechanical Tie. Consists of a white oak block 24 inches long, 10 inches wide and 5 inches high embedded in a ½-inch cushion of asphalt and supported by angles. The top of the block is covered by a ¼-inch steel plate, on which the rail rests. Eight bolts with rail clips pass through angle plate and block and are anchored in metal strips which extend beyond the block and provide an additional means for anchoring the joint booster in the concrete.

DMT Co

THE DAYTON MECHANICAL TIE CO.
704 Commercial Building
DAYTON, OHIO

DMT Co



Northern White Cedar Poles

FOR EVERY TYPE OF SERVICE

Northern White Cedar Poles are used to carry every type of modern service.

Poles shown in the large picture are at Muncie, Indiana, and carry the power, light, telephone and traction lines. Poles carrying the traction lines have been in place for over 15 years.

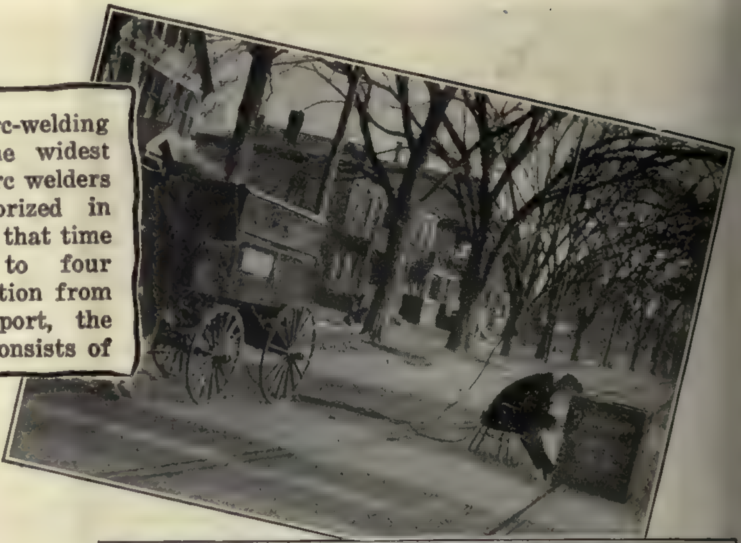
Insert picture shows the lines of the Fort Wayne & Indiana Traction Co. on the Fort Wayne and Peru Division. Poles are 35 ft. and were set 18 years ago.

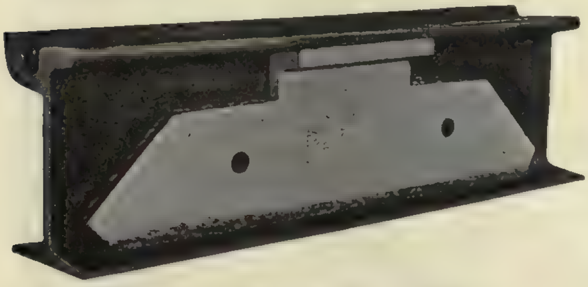
Northern White Cedar Poles are sturdy, straight and long-lived.

**NORTHERN WHITE CEDAR ASSOCIATION**

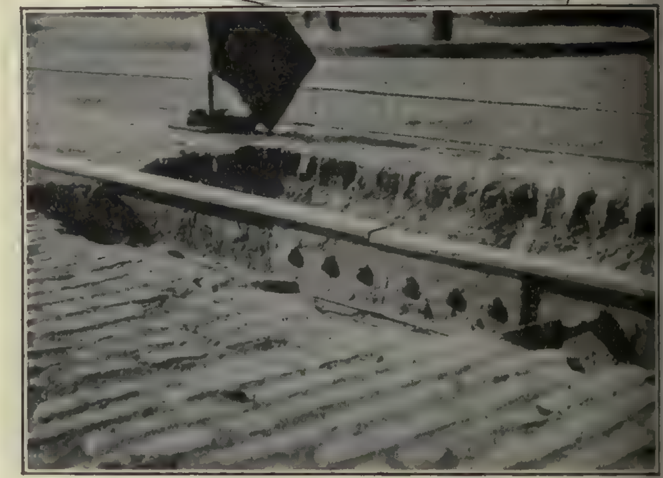
**Lumber Exchange** **Minneapolis, Minn.**

on electric railways. Of the various arc-welding processes, this method has at present the widest use. The purchase of the first Indianapolis arc welders by The Connecticut Company was authorized in 1914 for use on the Hartford division. Since that time similar welders have been furnished to four other divisions. In an accompanying illustration from a picture taken on Park Avenue, Bridgeport, the welder is seen mounted on four wheels. It consists of





## The "Apex" Joint
for Guard and Girder Rails



# This story refers to

# Indianapolis Electric Welders

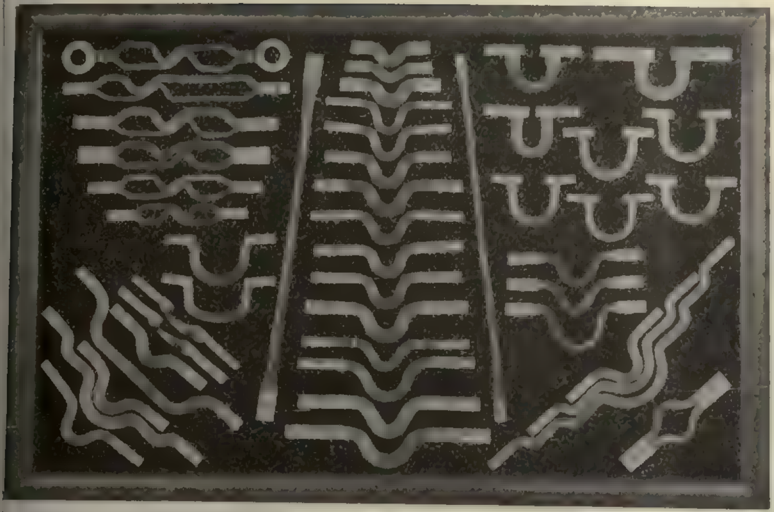
The illustration shows a badly cupped T-rail joint on Grand Avenue, New Haven. Prior to the use of the arc-welding process the repair of such a joint would necessitate cutting in a new piece of rail, usually about 4 ft. long. While this would allay the trouble temporarily, it would leave the job with two joints to be cared for in future in place of one.

Today 95% of the important street railways are not only Indianapolis-equipped, but consider Electric Welding indispensable for maximum operating efficiency.

The Indianapolis Electric Welder is portable, simple to operate and adapted to SHOP WELDING as well as TRACK RECLAMATION.

***Send for our 50-page booklet on reclaiming worn track and equipment.***

**Indianapolis Switch & Frog Co.**
Springfield, Ohio



# ERICO BONDS

welded to the track with the two-man

# ERICO Portable Welder

have the time tried ERICO reliability for a permanent, low resistance contact.

The ERICO Portable Welder is the most efficient and economical apparatus for rail bonding. The welder portion weighs 65 pounds—the Rheostat 140 pounds. The entire outfit is easily handled by two men.

Aside from bonding, the Rheostat can be used for general arc welding work.

**Let us give you a clear understanding of what ERICO Bonds and the ERICO Portable Welder can do toward saving money on your track and in the shops. Write for printed matter.**

ERICO
THE LINE OF LEAST RESISTANCE

**Electric Railway Improvement Co.**
Cleveland, Ohio

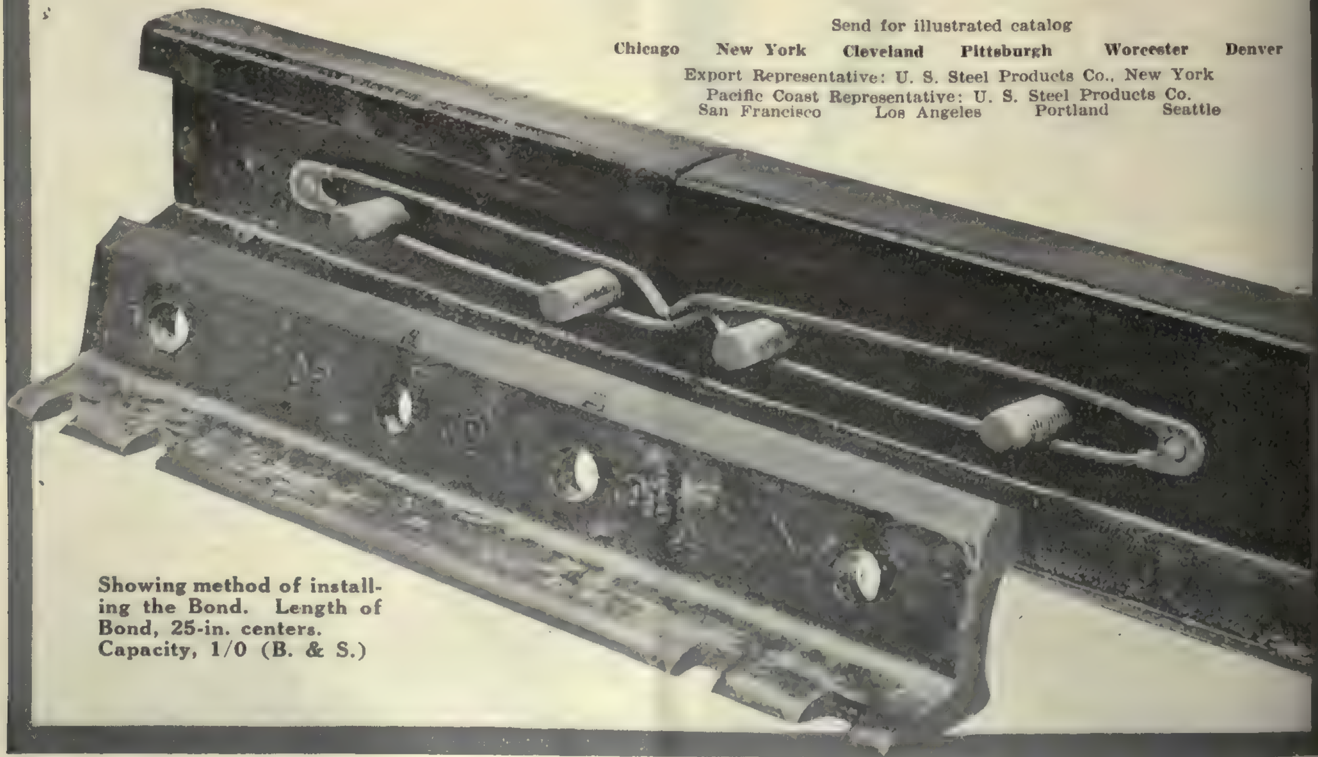
American Steel & Wire Company's
Crown Pin Duplex
RAIL BONDS

Used on the
HELL
GATE
Bridge

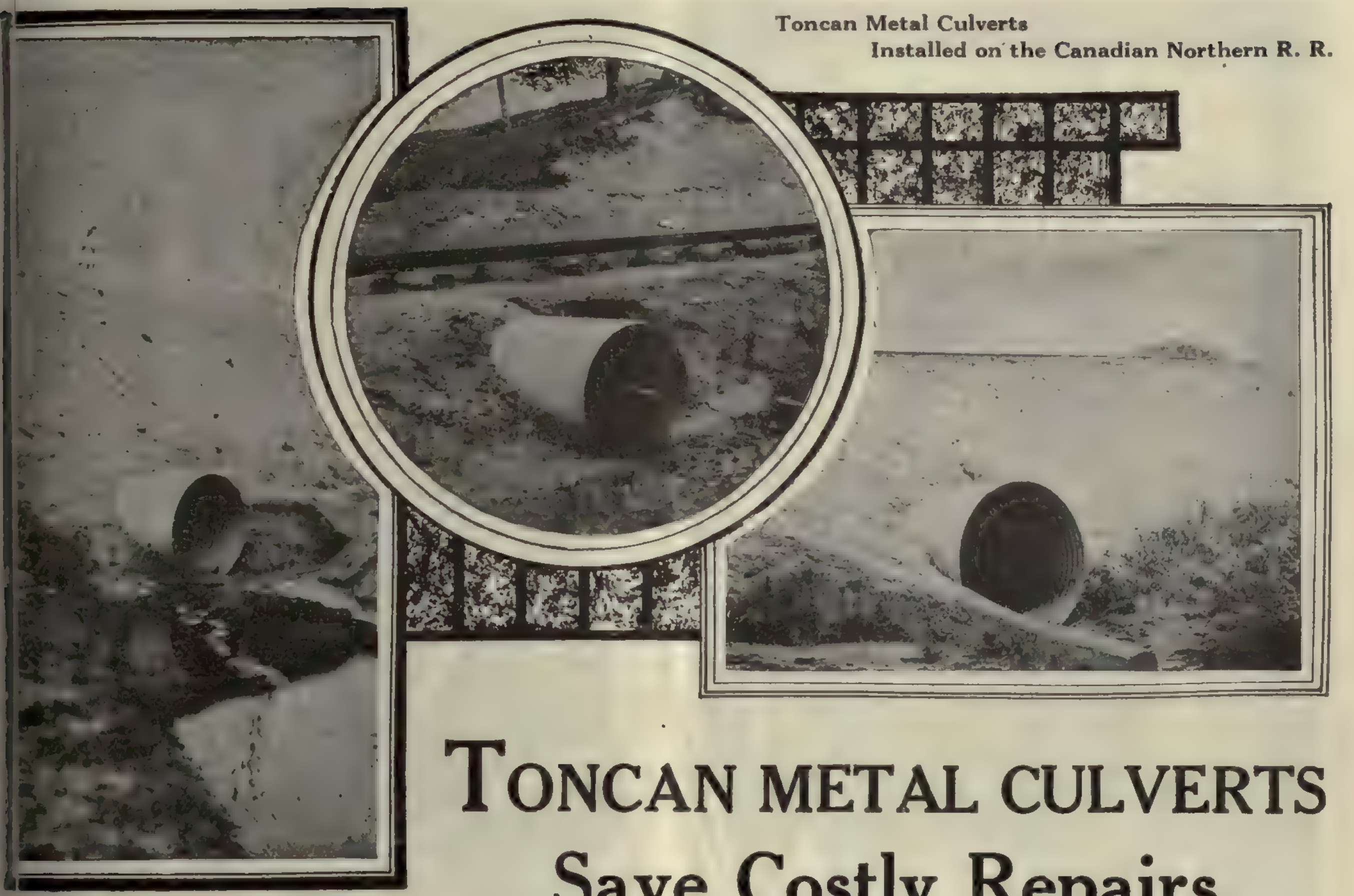
The American Steel & Wire Company's Crown Pin Duplex Rail bonds installed on the 125-lb. rails spanning the enormous Hell-Gate Bridge and Viaduct of the Pennsylvania Railroad System are well in keeping with the magnitude and permanence of the whole undertaking.

Like the bridge itself, they are made for hard usage and continuous service under severe conditions.

Send for illustrated catalog
Chicago New York Cleveland Pittsburgh Worcester Denver
Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle



Showing method of installing the Bond. Length of Bond, 25-in. centers. Capacity, 1/0 (B. & S.)



Toncan Metal Culverts
Installed on the Canadian Northern R. R.

# TONCAN METAL CULVERTS
## Save Costly Repairs

ter all, the economy of a culvert installation is determined by the cost per year of service. costs money to tear up. You can put in a flimsy, cheap culvert but it will prove extremely pensive. On the other hand, if you put in a heavy gauge, pure iron Toncan Metal Culvert u have a job which will last.

ncan Metal resists rust. Even where the corrosive uences are extreme it has proven its value thru rs of dependable service. The reason is that those purities which promote corrosion have been re- ved. Toncan Metal is a super-iron.

very interesting, instructive book entitled "Sheet tal Primer" presents concisely thru descriptions illustrations the scientific developments which e produced this metal which has the lasting quali- of old-time iron. You should have a copy. It is worth while to any one interested in better iron and better culverts. It is the same book now being used largely by colleges as a text book for engineers. We will send it upon reqest. You will find it worthy of a place in your reference library.

Tell us of the culvert work you have in mind and we will put you in touch with the culvert manufacturer nearest you who can supply your needs promptly. Toncan Metal culverts are ready for immediate delivery from numerous points thruout the United States and Canada. Kindly address Department Q.

**HE STARK ROLLING MILL COMPANY, Canton, Ohio**

SPC. TONCAN METAL

SPC. TONCAN METAL

"BLAW-KNOX"
Transmission Towers,
A-Frames, Poles, etc., are
world famous for their fine
structural quality, superior
design, and great strength. They
stand up through years of service. Ask
the "BLAW-KNOX" engineers to consult with you on your requirements.

**BLAW-KNOX COMPANY**
605 Farmers Bank Building
Pittsburgh, Pa.
New York, 165 Broadway
Chicago, Peoples Gas Bldg.
San Francisco,
630 Monadnock Bldg.
*Foreign Sales Representatives*
Gaston, Williams
& Wigmore, Inc.
39 B'way,
N. Y.
City

# Observe the figures on the face of this meter

Is there anything complicated about hem? As a matter of fact, aren't they as simple as the figures on a clock—if not simpler? That's all the motorman has to read when the

## ECONOMY METER

*"The Watchdog of Your Power"*

is used as an energy-checking and saving device on his car.

Simple? So simple that a school boy could take the reading.

Neither theorizing nor attacking argument will prove a point—only the underlying facts are conclusive. If any railway man is interested in installing an energy-saving device on his road, he will most certainly want to investigate the notable superiority of the ECONOMY METER for this service.

The ECONOMY Meter has no paper tape rolls to keep filled; no ink supply to maintain; no clock mechanism to rewind, oil and adjust; no fuses to blow and be replaced; no relays to stick or to burn out; no pneumatic plungers to be kept in such condition that they will function uniformly; in fact, it has no parts that are ever differently affected by wet, dry, hot or cold weather conditions, water or scale in the brake system. Maintenance work on Economy meters can be done as a bench job—no need to hold cars out of service while making repairs.

*Meter the Energy—That's What You Want to Save*

**ECONOMY ELECTRIC DEVICES COMPANY**
**General Sales Agent: Sangamo Economy Railway Meters**
**Old Colony Building, Chicago**
**National Railway Appliance Co., New York, Eastern Representatives**

# IRVI
# INSU

## —Its Service
## of Its Supe

## IRVINGTON PRODUCTS

Black and Yellow Varnish Cambric, Oiled Silks and Papers, Flexible Varnished Tubing, Cellulak Plates, Special Folded Paper for Coil Windings.

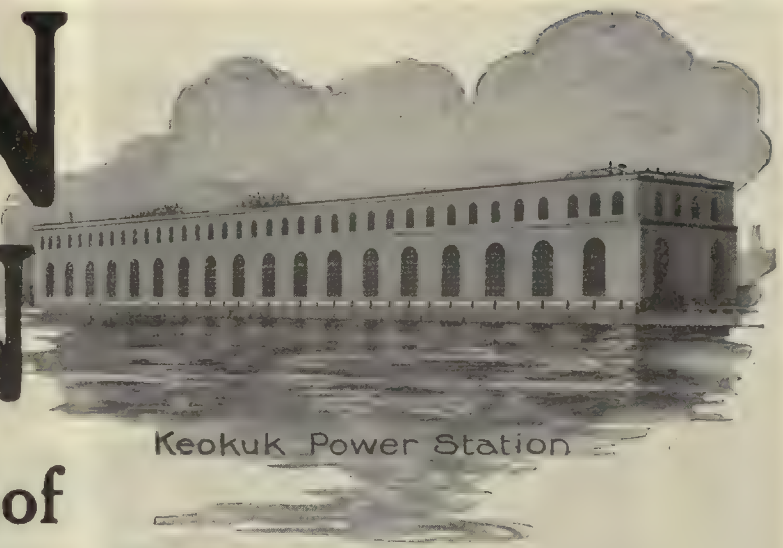
Irvington Black Varnished Cambric Tape has stood the most rigid tests and is accepted as the highest achievement in insulating tape yet produced.

Its use in the equipment of the Panama Canal, the great Keokuk Dam on the Mississippi and other big projects is proof of its ability to "stick on the job" defying surges and static discharges and assuring your continuity of service so far as insulation breakdown is concerned.

**IRVINGTON VARNI**

**Irvingto**

GTON
ATION



Keokuk Power Station

ig Projects Is Proof
ability to Serve You

IRVINGTON ADVANTAGES

High Dielectric Strength—Added protection for the same construction. High Resistance—Leakage reduced to minimum. Flexibility—The flexible nature of the material increases speed and efficiency of production without reduction of standards. Non-Hygroscopic—Leakage attendant upon atmospheric changes eliminated. Heat resisting—not affected by working temperatures. Chemically Neutral—Does not affect and is not affected by impregnating compounds or varnishes.

NSULATOR Co.
ew Jersey.

# V. V. FITTINGS

## FOR CARS, STATIONS, REPAIR SHOPS AND BARNS

### *For the Electric Railway Service*

V. V. Fittings and V. V. Safety Switches fill every conduit wiring need in Maintainence Shops, Stations, Car Barns and Cars. They help to insure perfect and continuous service in addition to minimizing repairs and maintainence.

The V. V. Line is complete in variety and with their interchangeable features they will help you save and reduce your stock requirements.

Our Catalog No. 21, covering the complete listing of V. V. Fittings and V. V. Safety Switches, is yours for the asking. Write today—

WE ARE AT YOUR SERVICE

Get V. V.'s into your Car Specifications

CONDUIT
·V·V·
FITTINGS

**V. V. FITTINGS COMPANY**

MAIN OFFICE AND WORKS
PHILADELPHIA PA. U.S.A.

BRANCH OFFICES
NEW YORK CHICAGO

Announcing

MARLIN—ROCKWELL

Rockbestos

Acid-Proof
Alkali-Proof
Insulated Wire
Fire-Proof
Moisture-Proof

What Rockbestos Is

ROCKBESTOS, as its name implies, is an insulation consisting of especially lengthy, fibrous, snowy white asbestos fibre absolutely pure and free from all such impurities as lime, iron and alumina, cemented together with a special chemically neutral cement, producing an indestructible Insulation that repels fire and defies time.

Being all Mineral there is nothing in it to disintegrate, deteriorate, dry out, or decay; varying degrees of heat and cold leave it unchanged.

ROCKBESTOS

INSULATED WIRE

Rockbestos in the form of a roving is evenly applied to the conductor in such a manner as to insure an adhesive, uniform, homogeneous wall of high insulation and dielectric strength, great flexibility, mechanical strength, durability, tenacity, acid proof, alkali proof, moisture proof and fire proof.

Indeed, Rockbestos Insulation is as durable as the wire itself and its employment insures generators, magnets, motors, solenoids, transformers, and electromagnetic windings of every description against burning out from any cause, reducing the possibility of breakdowns to a minimum and doing away entirely with any need of the expensive and time-consuming process of rewinding.

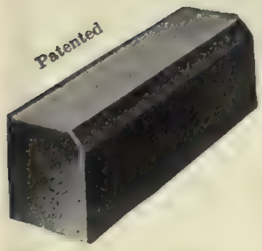
Rockbestos covered wire or cable has a field peculiarly its own. It must be used where considerations of safety from destructive and severe temperature rises in electrical apparatus will not permit the use of the conventional forms of conductors insulated with inflammable or slow-burning materials.

If you will so indicate, we shall be glad to submit you samples of Rockbestos Wire.

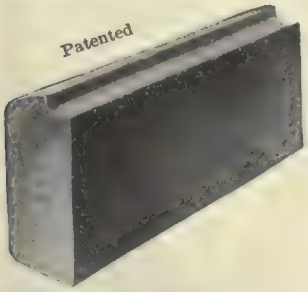
MARLIN-ROCKWELL
CORPORATION
INSULATED WIRE DIVISION
NEW HAVEN, CONN.

Nelsonville

Every Brick Perfectly Aligned



**Nelsonville Stretcher Brick**



**Nelsonville Filler Brick**

These bricks are laid *without grouting.*

They positively absorb vibration and shock.

They are the shortest way of obtaining a permanent, tight, level pavement with the minimum of paving repairs.

They permit the use of the old reliable, economical T-rail in street-car tracks, without the danger of "Kick-ups."

*THE PROOF of all our claims is in our booklet, "Rail Brick of the Right Sort"—shall we send it?*

THE NELSONVILLE BRICK CO.
Nelsonville, Ohio

# National Pneumatic Second-Saving Specialties Essential for Best Train Operation

There is no worth-while economy in surface car train operation unless the increased number of stops made and passengers carried are set off by faster handling of the passenger and prompter transmission of the starting signals. These necessary savings in time are obtained to the greatest possible degree only with

**National Pneumatic Door and Step Control**

For the quick, positive, laborless operation of doors and steps.

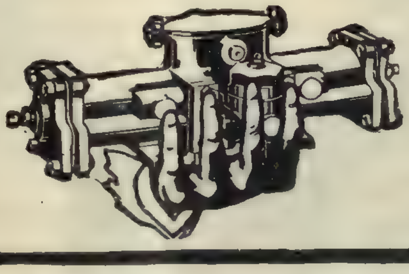
**National Pneumatic Interlocking Safety Door Control**

For the absolute prevention of the platform accident.

**National Pneumatic Motorman's Signal Lights**

For the immediate starting of the car after the doors are closed.

***We shall be glad to furnish full particulars at any time.***



**NATIONAL PNEUMATIC COMPANY** INC.

50 Church St., New York NPC 515 Laflin St., Chicago

How Thermit Insert Welds make rails jointless

**TheTenSteps**

1—Placing the Insert
2—The Sand Molds
3—Clamping the Molds
4—Preheating
5—Filling the Crucible
6—Pouring the Steel
7—Removing the Molds
8—Grinding the Weld
9—Maintaining Traffic
10—Inspection trip

## 1. "Here, gentlemen, you see him driving the insert between the rail heads."

"The ends of the rail heads have been cleaned and smoothed to insure maximum amount of contact surface. It is also necessary to bring the rails to the proper surface and alignment. You will always have various thicknesses of inserts on hand to fit the variation in gap due to temperature changes and other causes.

"In the following picture you will see the sand molds that are next applied. Watch closely."

**See these movies on your office wall!**

*We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.*

**Metal & Thermit Corp.**
**120 Broadway, New York**

**BRANCHES**
329-333 Folsom St., San Francisco.
15 Emily St., Toronto, Ont.
7300 So. Chicago Ave., Chicago.
1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

"He can check it with his own watch"

# 7 Reasons

## why you should choose

# Arthur Power-Saving Recorders

First—Because it talks the language of the motorman. It measures the power-on time—and (note this for it is important) it measures it in terms that the motorman understands—minutes. If you want to save power, encourage the motorman to shut it off by recording the minutes he has the power on.

Second—It encourages legitimate coasting without holding off the brakes until the last second each time.

It encourages the motorman to run with the power shut off—the natural way to save power and also the safest method of operation.

Third—The motorman has faith in the Arthur Recorder for the reason that he understands it easily. If necessary he can check it up with his own watch at any time. Because of this his cooperation is more easily obtained and better power-saving results are produced than where the motorman is more or less working in the dark.

Fourth—It requires but little clerical work to follow up the records.

Fifth—Where desired its figures can be used as a basis for arriving at car inspection intervals, so doing away with the cost of obtaining individual car mileages. Cars can be inspected on a "service" rather than on a mileage or daily basis.

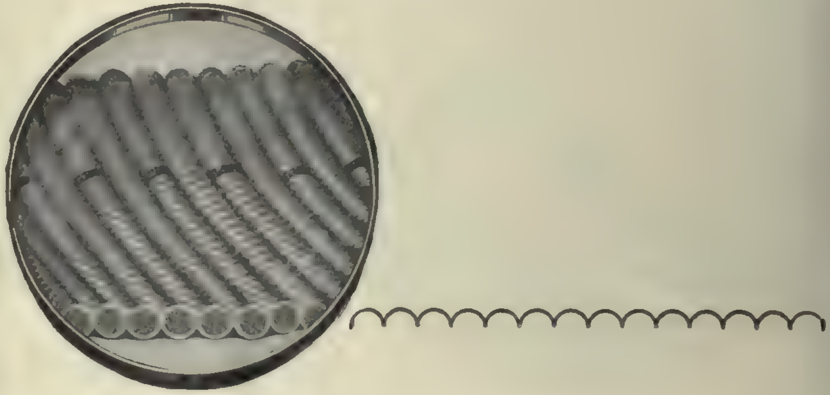
Sixth—Since it costs comparatively little and saves a great deal, it follows that it will pay for itself on any property in a very short time.

Seventh—You don't have to buy Arthur Recorders. If desired we rent them on easy terms and allow the full amount of the rental payments to apply on the purchase price.

The advantages of Arthur Recorders are substantiated by the solidest kind of facts, by hard cash saved on large scale properties.

*"It Talks the Language of the Motorman."*

**The Arthur**
**Power Saving Recorder Co.**
**New Haven, Conn.**



Here's the
"ROLLER-BEARING"
wireway of
**DURADUCT**
(Reg. U. S. Patent Office)

**Just This:**

**The inner surface of the tube consists of a series of hills and valleys. A wire fished through touches the high spots only.**

**This reduces friction to a minimum and makes fishing 75% easier.**

**Note also the single-wall construction peculiar to Duraduct.**

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS · PAWTUCKET · R. I.
A. HALL BERRY · GENERAL SALES AGENT
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THE BLACK DOTTED LINE IS THE MARK OF
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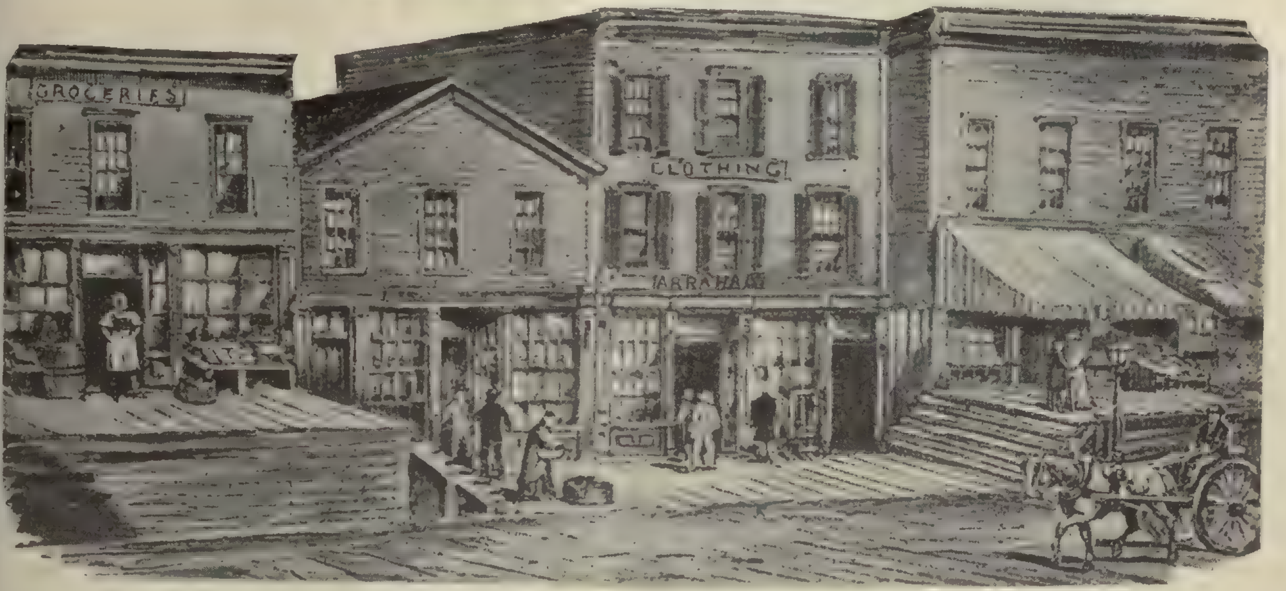

# A Business Center in Chicago in 1848

If ever there was a city whose growth has been a monument to the value of good transportation Chicago is "it."

In 1905 *fourteen per cent.* of all the railway mileage *in the world* terminated and centered in Chicago.

As early as 1897 Chicago had within its own limits nearly one thousand miles of street railways. To be exact, 957.82 miles. More than twice as much at the time as any other city in the world.

Think of the effect of this on Chicago's growth.

Look at its results as expressed in the appreciation of real estate values alone.

Before the railroads came to Chicago a lot at 144 Lake Street was sold for $100. Twenty years later $64,000 was refused for the same property.

The commerce of Chicago grew by leaps and bounds and this stupendous growth has been exactly coincident with the no less stupendous growth and improvement in methods of transportation.

There is no effect without a cause. The moral holds in the case of

## Galena Oils and Galena Service

Cause—better results at no more cost. Effect—roundly ninety per cent. of the railway lubrication business of America.

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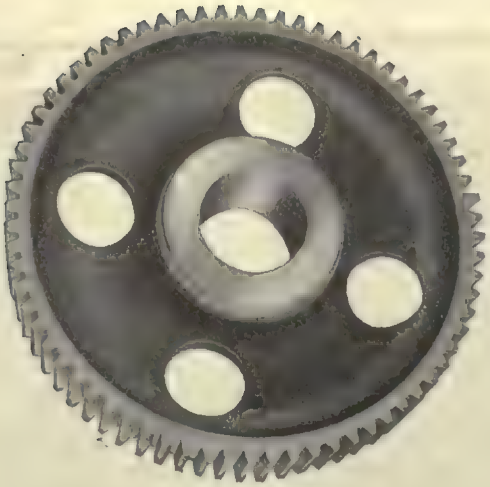

## Nearly twenty per cent of all railway gears bought–

Sales records for the past few years indicate that approximately 20% of all the gears now being purchased for electric railway motors are the General Electric Company's famous

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This increased business is not due to spasmodic stimulation. It is the result of a steady growth in grade M popularity, based on the solid foundation of genuine worth. Grade M gears are popular because they give more service for the money than any other grade.

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**General Electric Company**

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# Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

*Volume 53* New York, Saturday, May 17, 1919 *Number 20*

## Getting Ready for the Atlantic City Convention

NOW that the definite announcement has been made that the convention of the American Electric Railway Association is to be held at Atlantic City, Oct. 6 to 10 inclusive, and that there will be an exhibit in connection therewith, the prospective gathering takes on more tangible form. The choice of meeting place will meet with general approval, for somehow Atlantic City furnishes a combination of attractions for a large convention that is difficult to beat.

The exhibit will be of unusual value this year because it will show, in concrete form, the ways in which manufacturers have profited in a development way during the war period. There will be a certain zest to it, furthermore, on account of the hiatus which has interrupted the series.

It is a satisfaction also to know that the somewhat anomalous status which the manufacturing members of the association have occupied since 1913, when they were admitted as full members, is on the way to be ended by the organization of an affiliated manufacturers' association. This plan is discussed more fully in the following editorial.

With regard to the convention as a whole, the industry needs a "get together" of this kind more than ever before. While some sacrifice of time may be needed on the part of the members to insure adequate attendance at Atlantic City, such sacrifice will be well worth while.

## The Manufacturers Desire to Help the Association

WE HAVE already mentioned the hope of the executive committee of the association to authorize the establishment and admission of an affiliated manufacturers' association this year. The only reason for the delay of the past two years in this matter has been the war, and the accompanying cessation of all association activity except that directly connected with hostilities against the enemy. The subject is one which can properly be taken up now, however, and it is the intention of the committee in charge to push it through so that definite action on the admission of the new association to the main body can be taken in October.

In a matter in which there has been such a variety of opinions we have no idea that the plan of the committee when completed will be satisfactory in all its details to everyone. Nevertheless, the committee will make every effort to unite all ideas in a working plan and solicits constructive suggestions. The aim sought will be the good of the industry as a whole by enlisting and making effective the power which the manufacturers can undoubtedly bring to help in the solution of electric railway problems. This assistance the American Association has recognized but should recognize still more, and the approval of a constitution giving the manufacturers an opportunity to do what they can best do for the American Association will be a step in this direction.

There is a great chance now to forget all differences of opinion that may have existed in the past, to put a firm shoulder to the wheel, and to push with might and main to get the business out of the "slough of despond," in which it has been temporarily mired, and upon firm earth again.

## Rush-Hour Traffic Breaking the Industry's Back

ONE of the fathers of the electric railway industry once said that the "dividends are in the straps." It was a catchy phrase but merely a half-truth, and half-truths—like the Bolshevist doctrine that manual labor can be economically self-sufficient—are invariably vicious. That the rush-hour straphanger pays dividends has never been true. At the present time, he is a disastrous liability, although a certain acceptance of the twenty-year-old catchword in his favor has probably obscured the belief that the industry would be better off without him. In fact, the peak-load passenger is carried at a loss—a direct loss, not an indirect one—and to the extent that the electric railway can drive away traffic at the top of its peak it benefits itself.

Naturally, the public does not recognize this, yet the explanation may be made in relatively simple terms. For example, assume that a group of 100 prospective patrons appear before a railway management and request transportation from city to suburbs daily during the peak hour. Does the railway want this brand-new business? It does not! Not even if fifty of the passengers agree to strap-hang without kicking! Of course, the railway will, in the end, have to carry the new patrons but it would much prefer that they walk.

In the first place, a new car for these passengers must be purchased for, say, $8,000, and on this there will be an annual charge of $960 for interest and depreciation, or $4 per day, considering the electric railways' five-day week of peak loads. As the car can make only 10 m.p.h. and will run, say 5 miles out and back, it will complete its round trip after the peak hour has passed. This will limit the period during which it is needed to carry passengers to one trip per day and will make the fixed charge for that trip $4. In the second place, additional power facilities to the extent of 30 kw. must be provided even though used only for one hour daily, and the resulting high demand charge will bring the power cost to $2 for the trip. Maintenance, carhouse expense, accidents, accounting and supervision will amount to about $1 for the 10 miles traveled. Platform labor, at the War Labor Board's intermediate rate of 45 cents per hour, would add 90 cents to the foregoing if the railway was lucky or skillful enough to make exact arrangements for a swing-run crew to handle the one-hour trip without paying for any dead time. At the other extreme, if all available crews were scheduled, and a new crew had to be hired for this trip alone, the platform expense would be the minimum day rate for the two men; perhaps $6. The probabilities are that a figure between these extremes, or say, $2, would represent a reasonable average, and by adding this the total direct cost for the trip would become $9.

One hundred new peak-hour passengers, including fifty straphangers, would thus cost the company—exclusive of any indirect costs on permanent installation—9 cents each. Whether each paid 5 cents or 8 cents for his fare would make only a difference in the amount that the railway could profitably pay each one to stay off the cars until after the peak or to walk. In fine, the electric railways not only don't want peak-hour traffic but, in the present situation, can't afford to handle it.

## Learning From the Experiences of Others

FOR the past seven months this paper has been publishing, in the "Mechanical and Engineering" issues under the heading "Some Mysterious Car Ailments," groups of short articles devoted to equipment defects. The intention has been to describe types of car equipment trouble whose cause is not evident without detailed investigation, and to give such information regarding methods of overcoming the difficulty as will be of assistance to both the user and the manufacturer. We have kept these articles entirely free from reference to individuals or roads affected in order that operating men might feel no hesitancy in sending in the results of their experience. The information was put in a rather unusual form to secure the widest possible reading of the articles. The plan has been primarily to answer these queries: "How did the ailment manifest itself?" "What was the real difficulty?" "What did investigation show to be the cause of the difficulty?" and "How was the ailment cured?"

A large proportion of the occurrences recorded so far have been with multiple-unit equipment. This was not because equipment of this type gives more trouble than other apparatus but rather because most of the roads from which we have received information for these articles happen to have this type in operation. Furthermore, as shop men are less familiar with its operation than with older types, any trouble occurring appears to them much more mysterious than in the case of platform-type controllers. No attempt has been made to give all the methods for overcoming the troubles listed, nor is it assumed that those given are the best for all conditions. In cases where changes in design are apparently advisable, we have endeavored to obtain the manufacturers' viewpoint and give our readers the benefit of their experience.

The articles seem to meet a real need and should be of help in reducing maintenance costs. Some manufacturers may have felt that undue prominence was being given to the troubles with their particular equipment, but as far as we know the ailments have concerned detailed faults, mostly of a minor character and reflecting little discredit on the design of the equipment. In any event, the overcoming of defects in design, or in inspection and maintenance procedure, is certainly in the line of progress.

## Citizen Mahon, Altruist!

ABOUT Citizen Mahon, president of the Amalgamated Association, many harsh things have been said, but none have been cruel enough to call him an altruist. Still, that is the only name that will fit him for his latest impassioned plea for the abolition of the modern one-man car. Why? Because no one knows better than he that hundreds of electric railways may have to go out of business altogether if they cannot use this means of keeping ahead of advancing costs. If these electric railways go out of business, their employees must go out of their jobs and paying dues to the Amalgamated simultaneously. Whereupon Mahon's, like Othello's, occupation would be gone. 'Tis indeed a noble sacrifice to turn Amalgamated carmen into gipsy jitneurs who owe allegiance to no unions whatsoever.

Citizen Mahon may not realize that it is he, and not the operator of the new one-man car, who is "pulling old stuff" in objecting to the seeming supersession of men by mechanisms. In principle he differs not an iota from the cotton-pickers who destroyed Eli Whitney's gin (the machine, not the liquor) from the hand weavers who broke the first power looms and from the horse-car directors who ascribed their rheumatism to those new fangled electric cars. Our good comrade's attempt to befog the question with talk about accidents is exceptionally naïve. In an article written in February, 1918, he sought to condemn the modern kind of one-man car by assigning to it the evils of the camouflaged junk put out here and there. This year Citizen Mahon is even more daring. His pathetic gloom about the accident possibilities of one-man cars are based upon the accident statistics of cars operated with two men!

It is hardly necessary to cite history to prove that no interests have ever proved powerful enough to stay for long the progress of labor-saving devices. What puzzles us most about Citizen Mahon, unless he really has become a 100 per cent altruist, is that he should object to the best means yet found of keeping his supporters in their jobs at higher pay for less fatiguing work, since he is thereby assured of a much steadier membership than is the case where one-half or more of the men drift on and off the car platform within a single year. Although a labor-saving device, the one-man car most emphatically does not force men out of their jobs. As we all know, the right introduction of this car generally means a big increase in service, often three cars for two. Then comes such a wave of public approval, expressed through heavier riding, that the happy manager is far more likely to augment than decrease his payroll. Of all the installations of modern one-man cars that we have had the good fortune to study, we have not run across a single instance where any man lost his job or where the one-man car operator failed to better his financial condition. As one manager said: "We have stopped firing and hiring. The men stick."

As for the accidents conjured up with such deep solicitude by Citizen Mahon, they are not only less numerous than with the old two-man cars but actually ss numerous than one would fairly expect when operors are adjusting their instincts to a faster acceleratg and faster braking car. Anyway, we wonder what itizen Mahon's alternative to the modern one-man car , for if these new cars are to be replaced by the trackss, reckless and *dues-less* jitney, the accident record ould be infinitely worse than his electric railway recd of one person killed for every 13,603,500 passengers rried. And would the families of the slaughtered get 8,176,305 from these irresponsible automobile ragauffins? Let Citizen Mahon answer!

## an You Furnish Real Data—If Not, Why Not?

TOO much emphasis cannot be laid upon the importance of the hearings that are to be held by e Interstate Commerce Commission during June and ly in regard to compensation for electric railway ulage of United States mail. There are two aspects this matter which electric railway operators should cognize.

The first is the one which concerns merely the rates r mail carriage. The 1918 change in the postal law, hereby it is made unlawful for any electric line to fuse to perform mail service at the rates provided hen required by the Postmaster General, renders it perative that electric railways help the government fix adequate rates. Back in 1916 the committee compensation for carrying United States mail of the merican Electric Railway Association could say with rrow that the electric lines must either go out of e business of transporting mail or continue to carry for less than cost. Now even the option of beming a mourner through the forced abandonment of losing practice is denied to the electric lines.

If the electric railways must carry the mails, therere, it behooves them to redouble their efforts to cure adequate compensation. All the railways now der mail contracts or likely to be should attend the oper regional hearings and present the most detailed ta possible in regard to the cost of operation. Full eight should be given in the case of pouch mail, in e absence of exact cost data, to increases in general erating costs and in volume of mail since old contracts re made, and in the case of independent car mail to overhead costs. The association has prepared a mmendable exhibit for companies to fill out in order at the data may be presented on a uniform basis. ve you begun to prepare your data?

The second aspect of this matter is more general. concerns the inability of some companies to furh real cost data instead of cost guesses. It is grettable, but none the less true, that the number blanks left in the association's exhibit will be an lex of the railway's lack of appreciation or, worse t, negligence of modern business practices. The me could be said of similar exhibits which might prepared to show terminal and movement costs for ssengers, freight and express costs, etc. Years ago urate costs were not needed, but to-day government d commission officials can only regard as slipshod industry whose managers and accountants in too ny cases specialize in objections to rather than rk toward such data. The electric railway industry a whole needs costs and the determination to get m.

## Automatic Control Applied to Motor-Started Converters

ANY engineer possessed of a spark of imagination, and successful engineers must have much more than a spark, cannot but be fascinated by the rapid development of automatic control for railway substations. Automatic control has proved its adaptability to a wide variety of applications, the latest being that to the old-fashioned motor-started rotary converter. R. J. Wensley tells in this issue just how the operation is performed. In this the elements that are of particular interest are the starting and cutting out of circuit of the starting motor and the act of synchronizing the rotary converter. Reading between the lines of this story the men who are familiar with the early days of the synchronous motor and the rotary converter will be reminded of some fundamental principles of which an earlier understanding would have saved much nervous energy and money. Just one of these may be cited for illustration.

When the alternating current generator was first developed it did not, in general, give satisfaction as a motor. It had to be brought up to synchronous speed by outside means and when synchronized showed a lamentable tendency to "fall out of step." Two among other important facts were then noted: (1) That inductance in the armature circuit stabilized operation, and (2) that eddy currents generated in the pole pieces (or in damper bars placed therein when laminated poles were used) could be used to bring the motors to speed and to prevent "hunting" when at speed. These simple but fundamental "discoveries" played an important part in the development of the rotary converter. Without them the automatic synchronizing described by Mr. Wensley would be very difficult, if not impossible.

In the plan described, the safeguards surrounding the converter are of prime importance. The induction starting motor is brought into action by low direct-current voltage, and it is cut out when the converter attains synchronous speed. This cutting out can be done electrically because the current falls to a low value as the starting motor approaches its own synchronous speed. It could, of course, be done mechanically also. The converter armature is then thrown in with reactors in circuit which not only limit the current but insure the proper phase relation of current and field flux to produce good torque. When the direct-current circuit goes on it contains resistors which also serve to limit the current. Hence the converter itself is between two sets of electrical "cushions" which serve to protect it from abnormal conditions. This cushioning action is supplemented, of course, by several protective relays. The safeguarding thus appears to be complete.

The automatic control of electrical machinery is for all the world like the "reflex" operation of the human nervous system. A sudden apparition before the eye causes a closing of the lid long before the brain has time to come into action. The blast of a Klaxon horn similarly arrests the step, bringing into instant sequence a complicated train of nerve signals and muscular contractions. So with carefully adjusted relays a drop in voltage or in load current, or a rise in temperature of apparatus or speed of rotary armature, sets in motion the devices for making the necessary changes in control circuit connection and the circuit breakers do the rest.

# Adapting Automatic Control to Motor-Started Converters

**The Author Presents Details of Relay and Switch Connections for Utilizing with Older-Type Converters the Principles Which Have Proved So Satisfactory in Automatically Controlling Self-Starting Machines**

BY R. J. WENSLEY
Switchboard Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

WHILE at present no motor-started rotary converters are being built in this country many old-style machines of this type are in service. These machines, in many cases, are still good for a long service period and it is quite possible that traction lines operating such machines may desire to provide them with automatic control. Such a control has been developed by the Westinghouse Electric & Manufacturing Company.

The control of motor-driven rotaries presents several problems not present with self-starting machines. The former must be synchronized with the line after having been brought up to speed by means of its starting motor. It also builds up with a definite polarity before reaching synchronous speed. These facts make necessary a slightly more complicated control scheme than need be used with the self-starting rotary.

Obviously any synchronizing scheme involving automatic speed control and the closing of the main switch at the point of synchronism is too complicated for practical use. Hence, reactance synchronizing was adopted for the automatic control on account of its relative simplicity. In reactance synchronizing the machine is brought up to approximately synchronous speed, the motor is then cut off, and the machine is thrown onto its transformer through reactance of sufficient magnitude to limit the flow of current to less than full-load value. The machine is then allowed to settle and to pull into step through the reactance. When it is in step the reactance is short-circuited, thus connecting the transformer directly to the converter rings. The direct-current switches may then be closed and the load put upon the machine.

Experience covering approximately a year with apparatus of the type described herein indicates that practically every contingency met with in actual operation has been anticipated and provided for. The equipment as described brings up a 300-kw. converter to speed, synchronizes it and picks up a load in from thirty to fifty seconds, obviously very much more rapidly than can be done in the old-fashioned hand operation.

The circuit diagrams for the new control as reproduced in Figs. 2 and 3 show the plan of connections and sequence of operations. To permit comparison with the same matters in connection with automatic control of self-starting converters, Fig. 1 is given.

## STARTING THE ROTARY CONVERTER AUTOMATICALLY

Let us first take up the steps in preparing the converter for connection to the line and the devices provided for doing this with proper safeguarding of the machine. As the rotary is to be started by undervoltage, a relay (No. 1, Fig. 3) is provided to close its contacts when the trolley voltage falls below, say, 450, the relay being connected between trolley and rail. Means of changing the adjustment are a feature of this

## Automatic Control of Motor-Started Synchronous Converter

***The Primary Functions of the Control Are:***

1. Inaugurate the starting process when the voltage falls below a set value.
2. Bring the starting motor up to speed.
3. Cut out the starting motor.
4. Connect the converter armature to the power transformer secondaries at approximate synchronism, with reactance in circuit.
5. Force the rotor to "slip a pole" if "reversed."
6. Short-circuit the converter starting reactors.
7. Connect the machine to the direct-current line through cushioning resistors.
8. Cut out the station if the current falls below a set limit for a definite time.

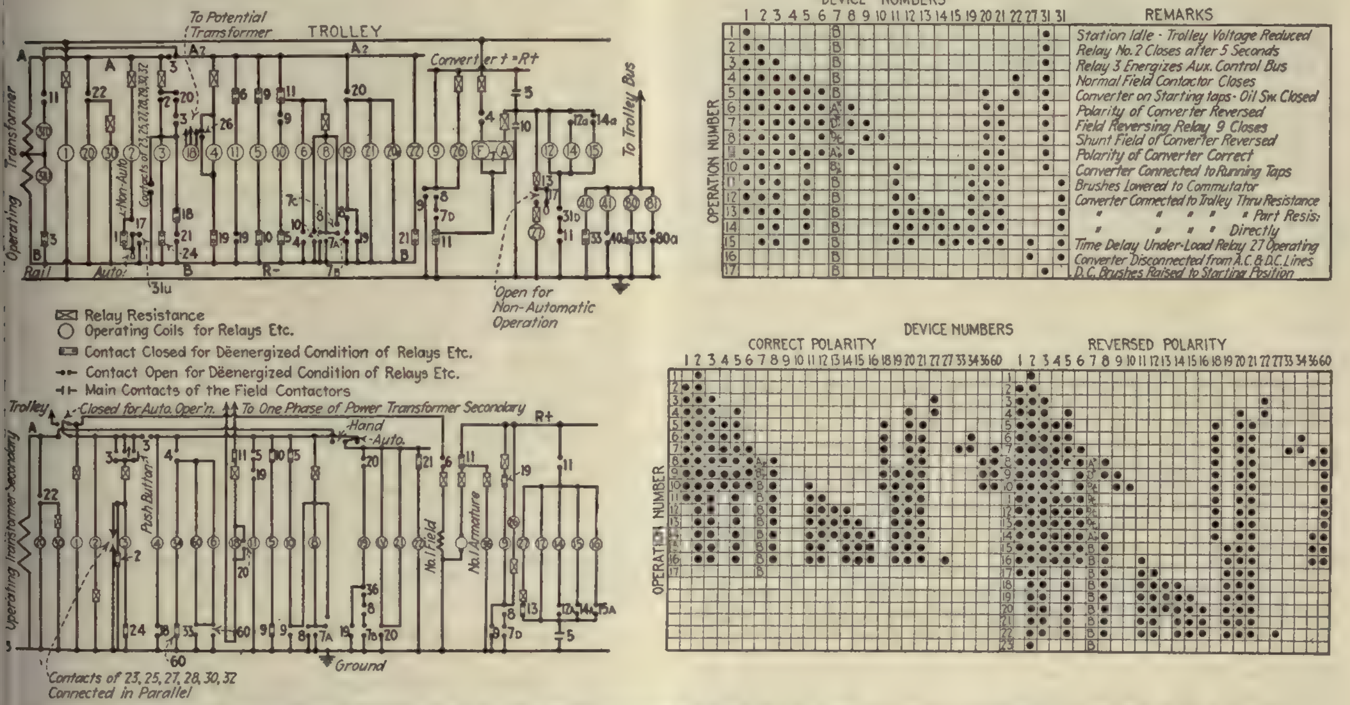
***The Control Must Also:***

1. Fail to bring the station in if the alternating current voltage is too low or if the phase rotation is in the wrong direction.
2. Cut out the station if the alternating-current supply becomes defective.
3. Cut out the station if the alternating-current circuit is overloaded.
4. Cut out the station if direct-current power flow is reversed.
5. Cut out the station if a direct-current overload occurs.
6. Cut out the station if the machine overspeeds.
7. Cut out the station if the bearings overheat.

elay, permitting the closing point to be varied to suit ocal conditions. There is also an induction-type voltge relay (No. 2), to insure the presence of sufficient ne potential to start the converter and satisfactorily to perate the control. If this relay fails to open its conacts, due to insufficient voltage, no other switches can lose and the station will not start.

The master control switch (No. 3) is a contactor hrough the contacts of which all alternating-current ontrol circuits pass, with the exception of the main losing circuit of the oil circuit breaker which is reayed by a separate magnet switch (No. 22). By means f No. 22, the oil circuit-breaker (No. 20) is closed imediately after the closing of No. 3. A dash-pot relay No. 21) serves to open the closing-coil circuit after the reaker is closed.

Assuming now that the trolley voltage has been low nough to close No. 1 and high enough to open No. 2, Io. 3 will have been closed and power is available for tarting the starting motor. We come next to the conactor (No. 4) in the main starting control circuit. his will not close unless a polyphase relay (No. 18) ndicates the presence of sufficient voltage on all phases nd the proper phase rotation. This relay is connected o the transformer secondaries, so that even if polyhase voltage is available on the supply line the staion will not start if, through some fault of the oil ircuit-breaker or the connections, polyphase voltage is ot present at the converter slip rings.


To Potential Transformer
TROLLEY
Converter + =R+
To Trolley Bus
Operating Transformer
Non-Auto
Contacts of 23, 25, 27, 28, 30, 32
Rail
Auto
Open for Non-Automatic Operation
Relay Resistance
Operating Coils for Relays Etc.
Contact Closed for Dëenergized Condition of Relays Etc.
Contact Open for Dëenergized Condition of Relays Etc.
Main Contacts of the Field Contactors
DEVICE NUMBERS
OPERATION NUMBER
REMARKS
Station Idle - Trolley Voltage Reduced
Relay No. 2 Closes after 5 Seconds
Relay 3 Energizes Aux. Control Bus
Normal Field Contactor Closes
Converter on Starting taps - Oil Sw. Closed
Polarity of Converter Reversed
Field Reversing Relay 9 Closes
Shunt Field of Converter Reversed
Polarity of Converter Correct
Converter Connected to Running Taps
Brushes Lowered to Commutator
Converter Connected to Trolley Thru Resistance
" " " " " Part Resis:
" " " " Directly
Time Delay Under-Load Relay 27 Operating
Converter Disconnected from A.C. & D.C. Lines
D.C. Brushes Raised to Starting Position
Trolley
Closed for Auto. Oper'n.
To One Phase of Power Transformer Secondary
R+
Hand
Auto.
Operating Transformer Secondary
Push Button
No. 1 Field
No. 1 Armature
Ground
Contacts of 23, 25, 27, 28, 30, 32 Connected in Parallel
CORRECT POLARITY
REVERSED POLARITY

AT TOP, FIG. 1—SCHEMATIC DIAGRAM AND SEQUENCE CHART FOR AUTOMATIC CONTROL OF SELF-STARTING ROTARY CONVERTER; AT BOTTOM, FIG. 3—SCHEMATIC DIAGRAM AND SEQUENCE CHART FOR AUTOMATIC CONTROL OF MOTOR-STARTED ROTARY CONVERTER

(Fig. 1 is reproduced for comparison with Fig. 3)

Immediately following the closing of No. 3, a twoole contactor (No. 34) in the starting motor circuit oses and the motor brings the converter up to speed in e usual manner. A current relay (No. 33) opens as e induction motor passes through synchronous speed, pening No. 34 and closing relay switch No. 60 through which the main starting contactor (No. 6) is closed. No. 6 connects the converter rings to the transformers through three single-phase reactance coils and the converter pulls into step with the line.

### THE CONVERTER SOMETIMES COMES IN WITH REVERSED POLARITY

The rush of current at the moment of closing No. 6 occasionally reverses the polarity of the machine, which builds up some direct-current potential while on the starting motor. This condition is taken care of by a polarized motor relay (No. 7), the design and operation of which are as follows:

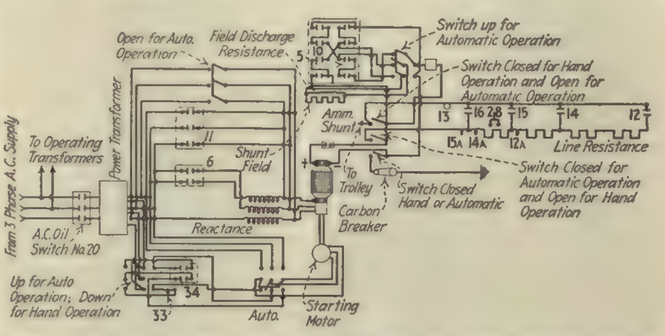
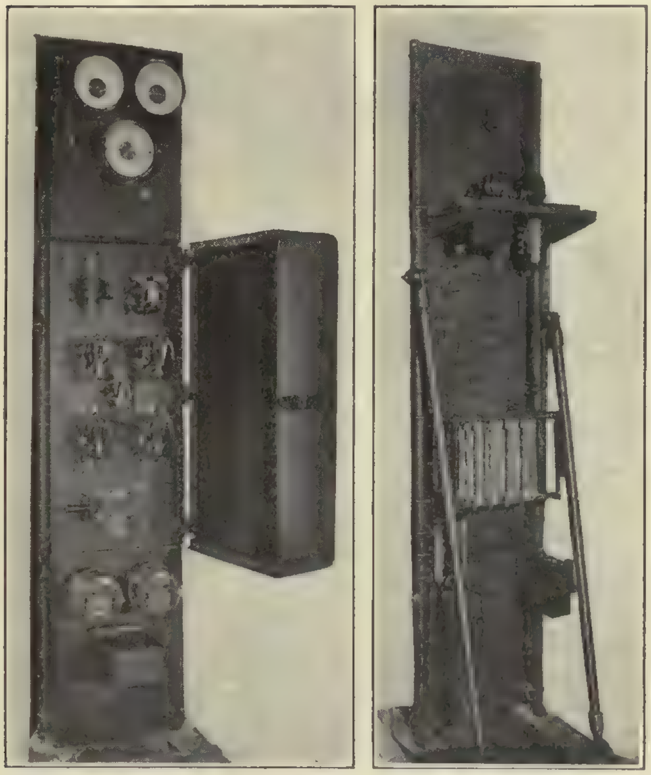

Open for Auto. Operation
Field Discharge Resistance
Switch up for Automatic Operation
Switch Closed for Hand Operation and Open for Automatic Operation
Power Transformer
From 3 Phase A.C. Supply
To Operating Transformers
Amm. Shunt
Shunt Field
Line Resistance
Switch Closed for Automatic Operation and Open for Hand Operation
To Trolley
Switch Closed Hand or Automatic
Carbon Breaker
Reactance
A.C. Oil Switch No. 20
Up for Auto Operation; Down for Hand Operation
Auto.
Starting Motor

FIG. 2—SIMPLIFIED CIRCUIT DIAGRAM FOR SUBSTATION WITH AUTOMATIC CONTROL OF MOTOR-STARTED ROTARY CONVERTER

No. 7 relay consists of a tiny motor with a permanent magnetic field. Its armature is geared to a small skeleton drum switch having four positions (see illustration). The contacts made in the several positions are designated by *7A*, *7B*, *7C*, and *7D* in the diagram. The armature of this motor is supplied from the converter direct-current brushes during the starting period. Since the motor has a fixed field, the direction of rotation is dependent upon the polarity of the converter brushes. If the converter is "upset" and locked into step inverted the relay revolves backwards, closing contacts *A* and *D*. Point *A* closes interlocking relay No. 8, which locks in through its own contacts when closed. Point *D* energizes field-reversing relay No. 9, which opens main field switch No. 5 and closes reverse field switch No. 10. The field-reversing relay is operated from the direct-current converter brushes and locks itself in after having been closed.


FRONT AND REAR VIEWS OF MASTER CONTROL PANEL

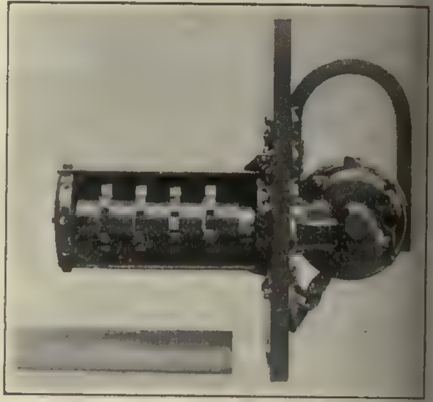
The reversal of the field causes the direct-current potential to die away, and when it has reached a point close to zero the field-reversing relay will no longer be held in and will open. This will open the reverse field switch and close the main field switch. This reversal of the field will cause the machine to slip a pole and come up with correct polarity. The polarized motor relay will then run in the opposite direction, closing contacts 7*A* and 7*B*. Contact 7*A* closes No. 8, which was opened by one of the contacts on No. 9. Contact 7*B* will close the circuits to No. 19, the running switch relay. In this circuit is the contact of No. 36, a direct-current voltage relay which is connected to the direct-current brushes. This is set to pull in at a point near the maximum direct-current voltage obtainable while reactance is in circuit. Thus the reactance will not be short-circuited until the machine has settled into step and has pulled up as near to exact synchronism as possible.

The motor relay will continue to revolve if No. 36 is not closed. Contact 7*C* will drop out No. 8; contact 7*D* will not cause any action because interlocking relay No. 8 is open. After No. 36 closes, the next time that contacts 7*A* and 7*B* are made No. 19 will close which in turn will close the running switch No. 11.

The master relay panel is shown in one of the illustrations; the mounting of the motor relays on brackets behind the panel are shown in another. The alternating-current switches are mounted on a third panel which may be located in the position most economical with respect to use of cable.

### THE DIRECT-CURRENT CONTROL IS VERY SIMPLE

The converter is connected to the line through a series of cushioning resistors which are short-circuited in three sets. The closing of the main contactors is governed by current-limit relays which prevent the cutting out of the resistors in case the current demand is in excess of the current rating. The assembly of contactors and current-limit relays is shown in still another illustration. The station is held on the line by means of a current relay (No. 13) which is set to operate at about 15 per cent of normal full load. In its de-energized position this relay closes a circuit through the time relay No. 27. No. 27 consists of a small shunt-wound direct current motor with a magnetic clutch driven through reduction gearing having a ratio of 19,800 to 1. The clutch drives an arm which closes the contact at the end of the stroke, short-circuiting the coil of No. 3 and thus shutting down the station.


THE POLARIZED MOTOR RELAY (NO. 7)

If the load demand comes on while the time relay is operating then No. 13 picks up, opening the circuit to the time relay and de-energizing the clutch. Thus the moving arm is allowed to return to its back stop. This clutch action provides an instantaneous reset which prevents the time relay from having a cumulative characteristic.

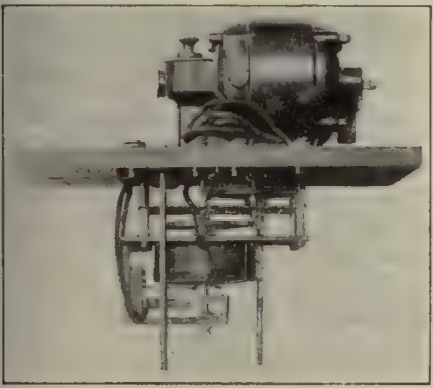
### SAFEGUARDING THE SUBSTATION APPARATUS

An automatic substation must necessarily be better protected than an ordinary manually-operated station because the automatic control is required to take care of all operating contingencies that may arise. The protective features which have been provided in the control equipment under discussion are described below.

*Protection against Low Voltage at Starting.*—Relay No. 2, an induction type relay operating on single-phase potential, is calibrated to open its contact at 80 per cent of normal line potential. In case there is insufficient potential to start the converter this relay will not open.

*Protection against Reversed Phase and Phase Failure.*—Relay No. 18, a standard type "CP" induction relay having polyphase potential coils, is operated directly from the power transformer secondaries, so that if for any reason polyphase potential of adequate amount for operation of the converter is not present this relay will not close its contact. Thus the starting switch circuit relay will be opened and the station will be disconnected from the line.

*Protection against Alternating-Current Overload.*—The overload protection is normally set for 200 per cent of normal full-load current and with a sufficient time interval to allow the direct-current overload relay to operate in advance of the alternating-current relay. On equipment with primary voltage of 17,000 or less, current transformers and type "CO" relays are used, these being standard induction overload relays. For potentials above 17,000 volts a series high-tension induction relay is used which obviates the necessity for using current transformers insulated for the full line voltage.


THE UNDERLOAD DELAY RELAY

*Direct - Current Reversed - Current Protection.*—Protection against reversal of energy flow in direct-current circuits is guarded against by the use of a dynamometer-type reverse current relay of standard design. This relay has a very heavy shunt field and a light moving element with the winding energized from an ammeter shunt. If the station is tripped out by the reverse-current relay it will immediately attempt to start providing the demand exists and the alternating-current supply is adequate.

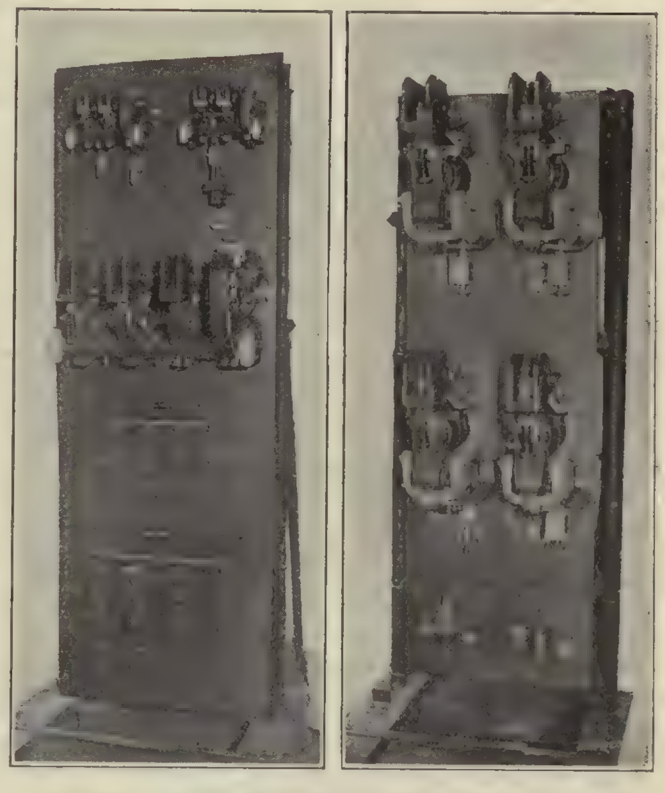
*Direct-Current Overload Protection.*—The current-limit relays 12*A*, 14*A* and 15*A*, are set for instantaneous action at approximately 175 per cent of normal full load current. This permits the utilization of the ability of the converter to withstand momentary swings, but does not protect the converter against continued overloads of less than 175 per cent of full-load current.

To guard against such a contingency a "Replica" relay is provided which is responsive to the effective heating value of the current passing through it. This relay is composed of a series coil connected in the converter circuit and a copper bellows filled with volatile fluid. When the series coil has heated sufficiently, due to continued overload, the volatile fluid is vaporized and the bellows expands thus closing the relay contacts and shutting down the station. The station will remain shut down until the series coil has cooled off enough to indicate that it is again safe to start.

When the series relays operate and open the contactors, thus putting the main resistors in circuit, the grids will become very hot if the short circuit or the extreme overload persists. A thermostat is mounted over the resistance grids and when a dangerous temperature has been attained this shuts down the station until the grids cool down.

*Overspeed Protection.*—The usual centrifugal overspeed device is used on the machine and this is non-resetting. In case of overspeeds sufficient to trip the device automatically the station must be visited by an inspector to reset the trigger and permit further operations.

*Bearing Protection.*—The machine bearings are protected against overheating by thermostats consisting of copper bulbs inserted in holes drilled through the side of the pedestal into the bearing housing, the bulb connecting with the copper bellows by copper tubing. The contact device is so arranged that when the heat of the bearing boils the fluid in the bulb the bellows expands and causes the substation to shut down. After once being shut down by this device it will not again restart until the thermostat is reset by hand.


AT LEFT, THE ALTERNATING-CURRENT PANEL; AT RIGHT, THE DIRECT-CURRENT CONTACTOR GROUP

## Steam Conveyor Versus Manual Labor for Ash Handling

AN AMERICAN steam ash conveyor was installed to replace the use of men and horses in a boiler plant containing a battery of one 500-hp. and five 150-hp. boilers operating continuously. The cost of ash disposal previous to the installation of the conveyor was as follows: Two ash wheelers, $10.88; one teamster, $4.08; one horse and feed, $1.50; making a total of $16.46 per day of twenty-four hours. The cost of ash disposal after installation of the conveyor was $4.08 for one laborer working nine hours per day Between fire cleanings this laborer acted as assistant fireman and boiler-room helper.

The method of operation consists in raking the ashes onto the boiler-room floor in front of the boiler, leaving them there until the cleaning is completed, and then scraping them into the conveyor. The complete cleaning requires about seven minutes. The boilers are cleaned every two hours.

# A Survey of Electric Railway Bridge Maintenance

### Bridges Require Systematic Inspection and Prompt Attention to Needed Protection and Repair, Both to Maintain Them in Safe Condition and to Insure Reasonable Structure Life

By R. C. CRAM
Assistant Engineer Department of Way and Structure,
Brooklyn Rapid Transit System

IN THE discussion of a paper on "Bridge Inspection and Reports," read by Herbert C. Keith before the Brooklyn Engineers' Club, and abstracted in the issue of this paper for Feb. 24, 1917, page 357, J. D. French said in part:

"A knowledge of the conditions concerning structures in service, the forces of wear and exposure to the elements, and the available means of resisting such forces by proper maintenance is manifestly of great value in the design of bridges and similar structures; but it is not always practicable for the designer to obtain knowledge of this kind when needed."

For the above reason, among others, Mr. French considers a knowledge of maintenance methods of very great value to designers. Such knowledge is obviously essential for the engineer responsible for maintenance, but it frequently happens that good maintenance is interfered with on account of failure of designers to work with the idea of economical maintenance in mind. The purpose of the present article is to suggest ways in which this condition can be bettered by discussing some of the matters which arises from time to time in connection with the maintenance of electric railway bridges. It is not the intent to discuss the broad subject of design of bridges, as that is a matter almost entirely foreign to maintenance although it is realized that design and details thereof play an important part in the creation of factors which may cause excessive maintenance expense. Sometimes a rather insignificant detail will prove to be the source of very costly repairs.

### HOW BRIDGES ARE CLASSIFIED

A bridge has been defined as any structure erected above the normal surface of the earth used for the passage of traffic of any kind. It is normally thought of as a structure forming a roadway over a watercourse or ravine. One classification of bridges is based on the position of connection of the floor system to the trusses and depth of trusses, when they are called "through," "half-through" or "pony truss" and "deck." The trusses of a through bridge are connected at the top by a system of lateral bracing and at the bottom by the floor system. A half-through truss has no top lateral bracing, while a deck bridge has its trusses connected at their tops by the floor system.

A truss may be defined as a combination of timbers, steel or other materials forming an unyielding frame for support of a floor or a roof.

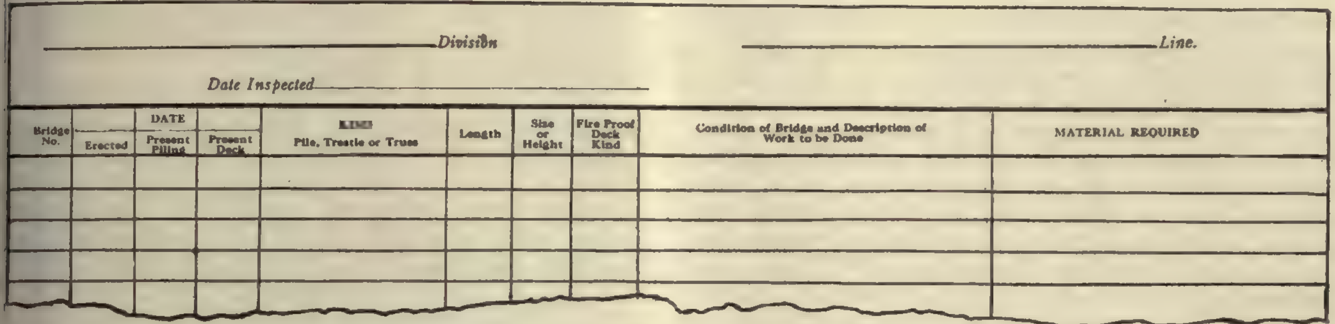
When considered on the basis of design or construction method, bridges are classified as truss, girder, lattice, trestle, arch, cantilever, suspension, pontoon, etc. When classed by operation method they are called draw, swing, lift, bascule, etc. A non-movable bridge forming an approach to a drawbridge (draw-span) is often spoken of as a "fixed span," to distinguish it from the draw span. They are also often spoken of according to the materials entering into their construction, as wooden or timber, steel, concrete, reinforced concrete, etc.

Bridges are designed for dead load, live load and impact. The dead load is the entire weight of the suspended structure. The live load is the load of the cars or trains which will use the structure. This is now based as a rule on some one of Cooper's loading series or classifications which are based on certain locomotive axle loads as produced when two locomotives are coupled together. The formula for impact is receiving considerable attention at the hands of bridge engineers but a common formula largely used in the past is $I = S\frac{300}{L+300}$, where $I$ equals impact stress to be added to live load stress, $S$ equals computed maximum live load stress for each member, and $L$ equals loaded length of track in feet producing the maximum stress in the member. Bridges having more than one track require that the aggregate length of all tracks producing the maximum stress shall be used. In the design of combination highway and electric railway bridges, the live load assumed must consider the heaviest traffic which can come on the bridge floor in addition to the load produced by electric cars. When footwalks are present, the load which these may produce gives another loading factor for consideration.

Since many electric railways cross highway bridges, the following information as to loads used for designing and for a standard of comparison with existing structures should be of interest as the Massachusetts specifications are widely used:

### Specifications of Massachusetts Public Service Commission for Electric Railway Bridges

For the track load these specifications use a 50-ton car with wheel spacing of 5 ft., 15 ft., 5 ft. and a total length of 40 ft. over all. For roadway and sidewalks loads of 100 lb. per square foot are used for city bridges and 80 lb. per square foot for country bridges 100 ft. or less in length. These uniform loads are assumed to cover the full area of the roadway and sidewalks except a width of 9 ft. at each track. For longer spans these uniform loads are reduced 1 lb. per square foot for every 5 ft. additional length up to 200 ft., and for all greater lengths 80 and 60 lb. per square foot respectively are used. For suburban bridges the floor is designed for the same loads as the city bridges, while trusses and girders are designed as for country loads. For highway bridges in city, town or country the specifications require provision for an alternative roadway load of a single 20-ton auto truck on two axles 12 ft. on centers and wheels at 6-ft. gage; the weight assumed to be distributed 6 tons on one and 14 tons on the other axle; the truck assumed to occupy a floor space of 32 ft. long and 10 ft. wide, the overhang being equal at front and back and at the sides. With track and



_______________Division _______________Line.

Date Inspected_______________

| Bridge No. | | DATE | | KIND | Length | Size or Height | Fire Proof Deck Kind | Condition of Bridge and Description of Work to be Done | MATERIAL REQUIRED |
|---|---|---|---|---|---|---|---|---|---|
| | Erected | Present Piling | Present Deck | Pile, Trestle or Truss | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

SPECIMEN PAGE OF BRIDGE INSPECTION BOOK USED ON BAY STATE STREET RAILWAY

uniform roadway and sidewalk loads impact of 25 per cent is added for floor beams and stringers, while for girders and members of main trusses the impact used varies from 25 per cent to 10 per cent according to the loaded length producing maximum live-load stresses, except that 40 per cent is used for counters and floor-beam hangers. With the auto-truck load 50 per cent impact is used for steel members which receive their full load from one panel point only and no impact is used for wood floor or stringers. Tension stress allowed by these specifications is 16,000 lb. per square inch of "structural steel." Other allowed unit stresses in general correspond with those given in other specifications using the same tensile stress, except that in direct compression these specifications allow only 12,000 lb. per square inch of steel, reduced by the Gordon formula.

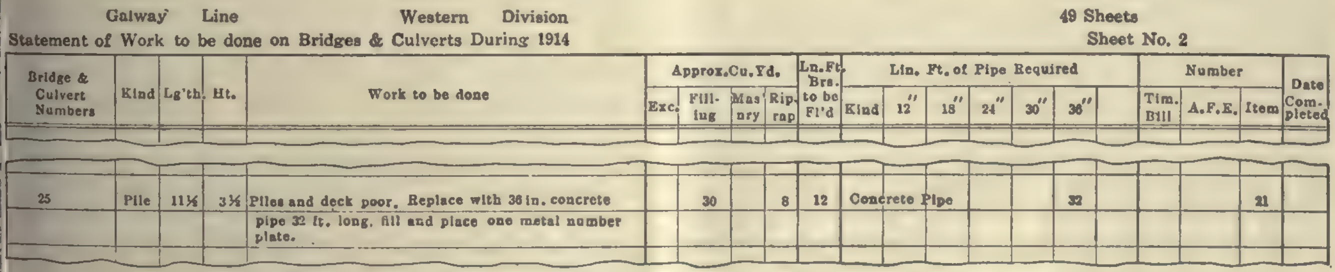
*Modifications of Massachusetts Public Service Commission Specifications for Use in the Consideration of Existing Structures.*—Although the specifications are eminently satisfactory for the design of new bridges or for the strengthening of old ones, as well as for use as a basis in investigating the capacity of existing structures which carry electric railways, there are many bridges for which certain features of these specifications would be unduly severe for determining fitness for further service. In other words, the specifications are considered for purposes of design but require modification for use in the consideration of existing structures and the desirability of continuing them longer in service.

The carrying capacity of a bridge is the heaviest live load which it may receive in regular service without subjecting the bridge to such stresses as will impair its strength. The capacity decreases slowly under ordinary conditions as the age of the structure increases, due to the deterioration of the materials. On the other hand, the capacity may decrease rapidly if the structure is continually overstrained by loads greater than those for which it was designed. Hence it is essential that any change in car equipment which affects the wheel spacing or axle loads should be the cause for a careful examination of all bridges (particularly the details of the floor system) over which the new equipment is to operate. It may be added that as a rule highway bridges deteriorate, according to excellent authority, more in one year than do railway bridges in two years if independent of the highway.

Electric railways generally do not maintain separate bridge departments to look after the upkeep of their bridges. This is partly due to the comparatively small size, in mileage, of the average road, which cannot afford the luxury even if the number of bridges might otherwise warrant. In many cases practically all of the bridges are highway bridges which are maintained primarily by the various civic officials in charge. Even on roads of considerable mileage with several hundred bridges, the engineer of maintenance of way is in direct charge of the bridges and he usually calls in a consulting bridge engineer when confronted with unusual bridge problems such as strengthening for heavier loads, rebuilding for double tracking and periodic expert inspection, the latter being required by law in several states.

The first requirement in connection with well-ordered bridge maintenance is an adequate record of the number and type of structures over which the maintenance engineer has charge. The simplest way to obtain this, if not on hand, is to start afresh and have a comprehensive examination of all bridges made by an engineer who makes a specialty of such work. Too much dependence cannot be placed in such plans as may be available in the office unless every detail has been carefully checked up, and as a rule the detailed plans of highway bridges crossed by electric railways are not to be found in the railway company's files. Some consulting engineer, during the construction period of the road, may have had them but he generally has kept them, too. The importance of having them is best

UNTREATED SOUTHERN YELLOW PINE BRIDGE TIMBERS AFTER TWELVE YEARS IN SERVICE



Galway Line Western Division 49 Sheets

Statement of Work to be done on Bridges & Culverts During 1914 Sheet No. 2

| Bridge & Culvert Numbers | Kind | Lg'th. | Ht. | Work to be done | Approx. Cu. Yd. | | | | Ln. Ft. Brs. to be Fl'd | Lin. Ft. of Pipe Required | | | | | | | Number | | | Date Completed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Exc. | Filling | Masnry | Riprap | | Kind | 12" | 18" | 24" | 30" | 36" | | Tim. Bill | A.F.E. | Item | |
| | | | | | | | | | | | | | | | | | | | | |
| 25 | Pile | 11½ | 3½ | Piles and deck poor. Replace with 36 in. concrete pipe 32 ft. long, fill and place one metal number plate. | | 30 | | 8 | 12 | Concrete Pipe | | | | | 32 | | | | 21 | |

SAMPLE WORK SHEET WITH AN ITEM INDICATING NEEDED REPAIRS appreciated when controversies arise with civic authorities over strengthening matters. In any event many details of bridges are changed in the shop and in the field during erection so that available plans may not be correct in rather important details.

The question arises as to what minimum length of span or width of opening may be classed as a bridge. Here it may be noted that the Public Service Commission of Massachusetts does not require reports from railroads upon openings of less than 10 ft. clear span. However, it is advisable to have general information available as to details of construction of all openings which interfere with the continuity of the ballast, excepting very small sluices for drainage between side ditches. Box and arch culverts and pipes are not usually classed as bridges, nor are they included in reports by special inspecting engineers unless their span is greater than 10 ft. and some special condition is observed which requires attention.

TABLE I—WORKING UNIT STRESSES FOR STRUCTURAL TIMBER EXPRESSED IN POUNDS PER SQUARE INCH*

| KIND OF TIMBER. | BENDING. | | | SHEARING. | | | | COMPRESSION. | | | | | | Ratio of Length of Stringer to Depth. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Extreme Fiber Stress. | | Modulus of Elasticity. | Parallel to the Grain. | | Longitudinal Shear in Beams. | | Perpendicular to the Grain. | | Parallel to the Grain. | | For Columns under 15 Diams. Working Stress. | Formulas for Working Stress in Long Columns over 15 Diameters. | |
| | Average Ultimate | Working Stress | Average | Average Ultimate | Working Stress | Average Ultimate | Working Stress | Elastic Limit | Working Stress | Average Ultimate | Working Stress | | | |
| Douglas Fir | 6100 | 1200 | 1 510 000 | 690 | 170 | 270 | 110 | 630 | 310 | 3600 | 1200 | 900 | 1200(1−$l$/60$d$) | 10 |
| Longleaf Pine | 6500 | 1300 | 1 610 000 | 720 | 180 | 300 | 120 | 520 | 260 | 3800 | 1300 | 975 | 1300(1−$l$/60$d$) | 10 |
| Shortleaf Pine | 5600 | 1100 | 1 480 000 | 710 | 170 | 330 | 130 | 340 | 170 | 3400 | 1100 | 830 | 1100(1−$l$/60$d$) | 10 |
| White Pine | 4400 | 900 | 1 130 000 | 400 | 100 | 180 | 70 | 290 | 150 | 3000 | 1000 | 750 | 1000(1−$l$/60$d$) | 10 |
| Spruce | 4800 | 1000 | 1 310 000 | 600 | 150 | 170 | 70 | 370 | 180 | 3200 | 1100 | 830 | 1100(1−$l$/60$d$) | |
| Norway Pine | 4200 | 800 | 1 190 000 | 590* | 130 | 250 | 100 | — | 150 | 2600* | 800 | 600 | 800(1−$l$/60$d$) | |
| Tamarack | 4600 | 900 | 1 220 000 | 670 | 170 | 260 | 100 | — | 220 | 3200* | 1000 | 750 | 1000(1−$l$/60$d$) | |
| Western Hemlock | 5800 | 1100 | 1 480 000 | 630 | 160 | 270* | 100 | 440 | 220 | 3500 | 1200 | 900 | 1200(1−$l$/60$d$) | |
| Redwood | 5000 | 900 | 800 000 | 300 | 80 | — | — | 400 | 150 | 3300 | 900 | 680 | 900(1−$l$/60$d$) | |
| Bald Cypress | 4800 | 900 | 1 150 000 | 500 | 120 | — | — | 340 | 170 | 3900 | 1100 | 830 | 1100(1−$l$/60$d$) | |
| Red Cedar | 4200 | 800 | 800 000 | — | — | — | — | 470 | 230 | 2800 | 900 | 680 | 900(1−$l$/60$d$) | |
| White Oak | 5700 | 1100 | 1 150 000 | 840 | 210 | 270 | 110 | 920 | 450 | 3500 | 1300 | 980 | 1300(1−$l$/60$d$) | 12 |

These unit-stresses are for a green condition of timber and are to be used without increasing the live load stresses for impact.

*Partially air-dry.

$l$ = Length in inches.
$d$ = Least side in inches.

NOTE—The working unit-stresses given in this table are intended for railroad bridges and trestles. For highway bridges and trestles the unit-stresses may be increased twenty-five (25) per cent. For buildings and similar structures, in which the timber is protected from the weather and practically free from impact, the unit-stresses may be increased fifty (50) per cent. To compute the deflection of a beam under long-continued loading instead of that when the load is first applied, only fifty (50) per cent of the corresponding modulus of elasticity given in the table is to be employed.

*From 1915 edition of Manual, American Railway Engineering Association. Adopted, see Vol. 10 1909 pp. 537, 564, 609-611.

### PAINTING IS ESSENTIAL FOR PRESERVATION OF IRON AND STEEL BRIDGES

There is no question as to the fact that paint properly applied and renewed is the most essential factor in protecting and preserving iron and steel bridges. Given two identical steel bridges, and other conditions being equal, that one which has had careful attention in the matter of painting will have the longer life with less cost for repairs. The purpose of the paint is to protect the metal from rusting by excluding moisture. It must be borne in mind that the steel should be thoroughly cleaned of all rust, scale and dirt before new paint is applied. The paint should only be put upon dry surfaces and painting work should not be undertaken in wet or freezing weather. By thinning the paint with turpentine, however, an experienced man can do good work in cold weather. The date of painting should be plainly indicated on the structure where it cannot be disturbed. It is hardly practicable to state the frequency of painting which may be advisable as climate, location, type of structure and several other factors create wide variations.

Certain points on steel bridges show failures in paint skin greatly in advance of the rest of the structure, namely, the upper horizontal surfaces such as top flanges of stringers, floor beams and upper chords. By watching these points an experienced inspector can quickly reach conclusions as to the time when the structure will need repainting. By cleaning and painting such places and by "spot painting" minor rust spots, the painting of the whole structure may often be deferred for a season.

Painting may be done by contract or by the company's own forces. The latter is preferable as it is more certain that the proper paints will be used and that the painters will be more likely to adhere to the rule for cleaning before painting. Only skilled painters, familiar with the painting of structural steel, should be employed. Contract painting presents difficulties in setting up a measure for payment unless the company has records in sufficient detail to apply as a check on the contractor's estimates. Furthermore, it is very necessary to keep an inspector with the contract painting gang all the time or the cleaning work will stand every chance of being slighted or even entirely omitted. The surfaces of the steel may be cleaned by using a hammer and chisel, wire brush or sand blast or scraping with special tools. While the sand blast is the most effective, it is also the most expensive and is seldom used.

Paints are made from various materials and in numerous forms and combinations. Consequently their relative efficiencies vary greatly. Certain pigments may have high waterproofing qualities and yet may actually stimulate corrosion of steel. Red lead mixed with pure linseed oil is a good rust-retarding paint. The most important and frequently used paints are mechanical mixtures of pigments and vehicles, which are a combination of pulverized solids and drying oils. The most durable paints are those composed of pigments with open-kettle boiled linseed oil as the chief ingredient of the vehicle. Pigments are classed as primary and secondary. The former are strong in color and covering power, while the latter are weak in these qualities and should not be used alone. The subject of paints and painting is one which requires much study, and the maintenance engineer may well afford to seek technical advice on the subject from his steam road friends who are responsible for bridge maintenance.

### PROPER BRIDGE MAINTENENCE REQUIRES CAREFUL INSPECTION

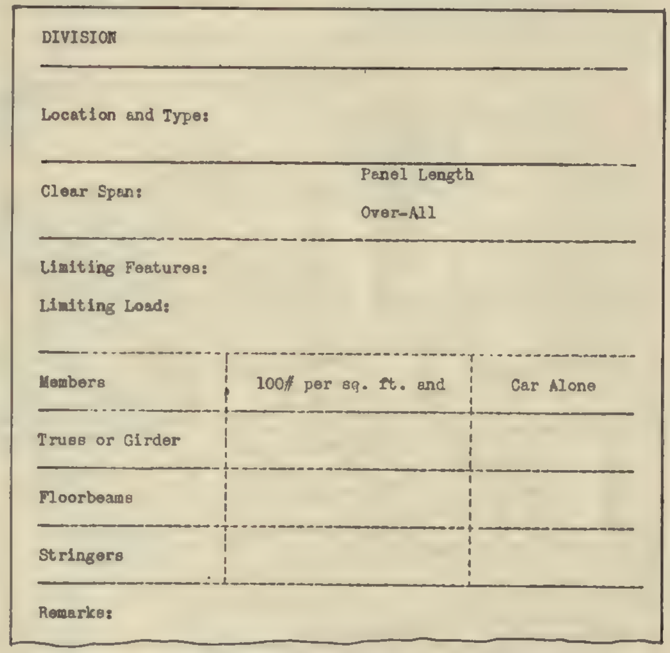
Safety of operation and continuity of service demand that bridges be given the most careful attention with respect to their maintenance. In order to do this, it is necessary that a rigid routine of periodical inspection and repair shall be followed year in and year out. The value of the inspections naturally depends upon the experience of the inspector both as to methods of maintenance and ability to forcast the effects of conditions found. Such inspections should be made, annually and preferably in the fall, so that the plans, work sheets (see page 953) and estimates for repairs may be made up in the winter and work started in the early spring. In some cases it may be advisable to provide for inspections twice each year, once in the spring and once in the fall.

The annual inspection should be thorough. A merely perfunctory examination, made while a car waits for the inspector, will not do. Hence the inspection should be made by the engineer who is directly in charge, or by assistants who are competent to do such work. In addition to the regular annual inspection, there should be an inspection by a consulting bridge engineer about every two years. Meanwhile the section foremen must be trained to make monthly inspections of the bridges on their sections, and these men should be instructed in regard to the general and particular features which should have their attention.

The notes (see page 953) concerning the condition of the structure should be made on the ground and, as far as possible, previous records of inspection and recommendations should be in hand so that it may be seen whether previously recommended work has been done. The spans, bents or piers of a bridge should be numbered always in the same direction for the same line, say from east to west or from north to south, commencing with No. 1 at the abutment, back bent or sill. Truss panels should be numbered in the same way and trusses should be designated right or left in the direction of the bent or panel numbering, although if the line and bent numbering read from south to north, the trusses can be designated east and west.

There is no short-cut method for making inspections in sufficient detail to be worth while. This is indicated by the number of things which need examination in connection with steel bridges for instance. Some of these are: (1) The rollers should move freely, at right angles to the line of the bridge and be free from rubbish. (2) Posts and compression members must be free from bends or bulges, with joints all having a firm, even bearing against each other. (3) Tension members must not be slack. (4) Floor beams and stringers must be examined for flaws in connecting angles and shelf angles, for defective, loose or missing rivets and for shearing or crushing of webs and flanges at connections. Riveted members require testing for loose rivets. In combined highway and electric railway bridges, the timber flooring must be examined, particularly the under course, for evidence of decay. Planking must be removed to permit examination of stringers and connections. (5) Bridge seats need to be examined for cracks; evidence of crushing, and to determine whether they are level. Parapet walls need attention to see that they are not encroaching, due to pressure of fill, upon the free movement of the free or expansion ends of the bridge. (6) The structure should be observed under passage of cars and vehicles, because swaying, excessive deflection, twisting and rattling of members will show that attention is required from the bridge gang.

Piers, abutments, retaining walls and culverts should be examined for undermining, scouring, bulging, cracking, settling or other movement. Fender piers or piling, cribbing and grillages must be watched as they frequently become disturbed and damaged during freshets.



DIVISION

Location and Type:

Clear Span:
Panel Length
Over-All

Limiting Features:
Limiting Load:

| Members | 100# per sq. ft. and | Car Alone |
|---|---|---|
| Truss or Girder | | |
| Floorbeams | | |
| Stringers | | |

Remarks:

BLANK FORM FOR USE IN MAKING DIGEST OF BRIDGE DATA

Timber bridges present inspection difficulties of their own and they need very careful attention since timber is very erratic in performance, while its deterioration is generally more rapid and more deceptive than that of metal. The principal aids in determining the condition of timber are sight, sound and boring. However, appearance alone is a poor gage of timber condition, although moist conditions found in dry weather are usually indicative of unsoundness. In general the sound of a timber as produced by striking with a 5-lb. machinists' hammer will give the best indication of condition, which may be further tested by jabbing suspicious spots with an awl or ice pick. Boring is resorted to where doubt still remains as to interior condition.

Trestle bents should be plumb. Sills and caps should be level. Piles need the most careful examination at the ground line and at the water line. Stringer joints and bearings on caps need careful attention. Guard timbers should be rigidly fastened to the ties and bolt heads should not project above the general surface of such timbers. This is to prevent their being struck by wheel guards, fenders and wings of snowplows.

In short stringer spans (whether of timber or steel) the ends of stringers are frequently found incased in the abutments. This practice is to be condemned and the condition corrected by freeing the ends as soon as possible. When so incased, corrosion is very rapid and the abutments soon crack and break, due to expansion of the steel.

In the paper already referred to Mr. Keith notes that corrosion and bolt holes in flanges of rolled steel beams reduce the strength far more than is generally realized. Of course the fact is known when thought of, but it is too commonly overlooked. The following figures illustrate these cases:

If a 12-in. x 31½-in. I-beam used as a stringer has
  One hole ¾ in. in diameter in one flange, the strength is reduced 12½ per cent,
  Two holes ¾ in. in diameter in each flange, the strength is reduced 28½ per cent,
  ⅛ in. thickness rusted from one flange, the strength is reduced 15¼ per cent.
If a 12-in. 20½-lb. channel used as a stringer has
  One hole ¾ in. in diameter in one flange, the strength is reduced 17¾ per cent,
  Two holes ¾ in. in diameter in each flange, the strength is reduced 21½ per cent,
  ⅛ in. thickness rusted from one flange, the strength is reduced 15 per cent.

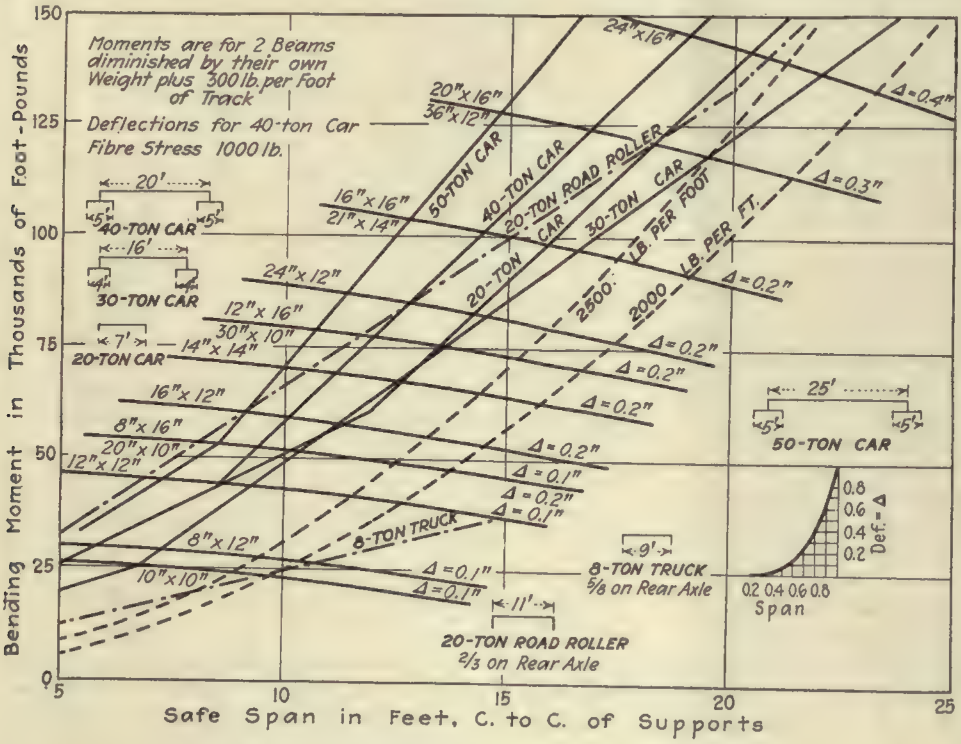


DIAGRAM SHOWING LOADS FOR WOOD STRINGERS

Timber stringers decay more rapidly when so incased, due to capillary action along the grain. Sapwood is more subject to decay than heartwood. Exposed ends of fibers contribute to decay and tops of stringers decay more than the sides or bottom. Timber laid with rings the concave side up decays faster than when laid with the convex side of the rings up. Wherever two timbers are placed close together dirt and moisture collect and rot results.

Mr. Keith says further that the reduction of the strength of timber stringers due to decay is not always appreciated. Regardless of the reduction of strength of individual fibers which, although not so far gone as to be called rotten are approaching that stage, a slight loss of section in the top or bottom of a stringer reduces the strength for resistance to bending altogether out of proportion to the amount of section lost. In a timber beam 12 in. deep a loss of

  1 in. in depth reduces the section 8 per cent and the strength 16 per cent,
  2 in. in depth reduces the section 17 per cent and the strength 30 per cent,
  3 in. in depth reduces the section 25 per cent and the strength 44 per cent,
  4 in. in depth reduces the section 33 per cent and the strength 55 per cent.

If the decay is uneven the loss of strength is even more striking. A 12-in. stringer having full depth at one side and reduced at the other side by

  2 in. has its section reduced 8 per cent and the strength reduced 28 per cent,
  4 in. has its section reduced 17 per cent and the strength 46 per cent.

Such cases occur where ends cut across the fiber are in contact with each other, as at stringer joints, or where trestle posts are set on sills and under caps. The practice of placing iron castings between sills and posts and caps and posts or between trestle caps or wall plates and stringers should be extended. Similarly the use of cast-iron spacers (in the form of "spools" on each bolt) between stringers, is far better than the old practice of using wood spacers. In addition to inspection of the structures, the adjacent streams and waterways require examination with the view of determining whether they need enlarging or cleaning, whether the waterway is insufficient, and whether embankments need rip-rapping. The general condition of line, surface, joint fastenings, and guard rails should have attention and tracks on approach. Fills should be watched for sagging especially at or near abutments. Further, the condition of paint on steel structures must be carefully noted. The condition of track bonding needs attention, as it is very desirable to prevent the escape of current to steel bridge structures.

Even timber trestles over salt water will require attention in this regard, and the writer has in mind a case where it was found that the current leakage was so great (partly because the structure was low and the tides high) that the track rails became badly corroded at the base, rendering the spiking insecure. It was remedied partly by setting up a girder rail with one end in the creek alongside the structure in guides and directly bonding to the track rails. It was surprising to note how rapidly the length of this "ground" rail decreased. The second part of the remedy consisted in replacing defective bonds on the whole line, and extending the return feeder cables.

Wood trestle bridges are very often used in the construction of a railway line to minimize the original investment by avoiding expense for heavy or long fills and more expensive steel or concrete structures, and even at times simply to hasten construction. They are, therefore, considered primarily as temporary structures which will create a certain amount of maintenance expense. The hope is that as the line develops they may be gradually eliminated. When the condition of a trestle or other structure warrants extensive repair or complete renewal, it is time to consider whether it should be eliminated or changed in order ultimately to reduce maintenance costs. Consideration should always be given to these projects when making up bridge maintenance schedules, following annual inspections.

It follows that an investigation of the question: Will it pay? must be made. Here the use of the formula advocated by G. L. Burr in the JOURNAL for June 3, 1916, should be of assistance.

Let us assume the following:

Reduction in annual operating expenses due to improvement $= S$
Replacement charges for improvement $= R$
Capital charges for improvement $= C$
Total charges for improvement $= R + C = T$
Estimated life of improvement (years) $= L$
Customary rate of interest $= r$
Increase in annual net earnings due to improvement $= N$

We must now remember that, as a result of the improvement, increased capital charges equal to $rC$ must be met each year. Also, in the final analysis, a sum equal to $\frac{C}{L}$ should in some way be potentially reserved, charged off or held back in the surplus annually to maintain the integrity of the additional capital investment. Finally, the annual prorate of the replacement charges for the improvement amounting to $\frac{R}{L}$, should be taken into consideration. The particular method of accounting for these processes is of small importance, as the main fact to be kept in mind is that, consciously or unconsciously, the indicated charges or expenditures must be met.

The following equation may then be written:

$$N = S - rC - \frac{C}{L} - \frac{R}{L}$$

Thereupon, obviously the improvement will pay whenever $N$ is greater than zero. This condition may be expressed thus:

$$N = S - rC - \frac{T}{L} > 0$$

$$S > rC + \frac{T}{L}$$

In other words, the improvement may be made when the saving in operating expenses exceeds the sum of the increases in interest charges and amortization and replacement expenses.

While bridge and trestle piling has been treated with preservatives by many railroads, the practice is not so extensive as it should be. Similarly other bridge timbers until recently have been mainly overlooked in this regard. When bridge timbers have been treated, creosote has been most extensively used but it may be noted that the Boston & Maine Railroad uses a brush treatment for bridge timbers. While creosoting by some pressure process is considered the most effective method of treating bridge timbers, the present high cost leads to greater use of open tank treatments, which have a far greater value than has usually been acknowledged. The photograph on page 953 indicates the condition of untreated yellow pine trestle stringers after twelve years of service.

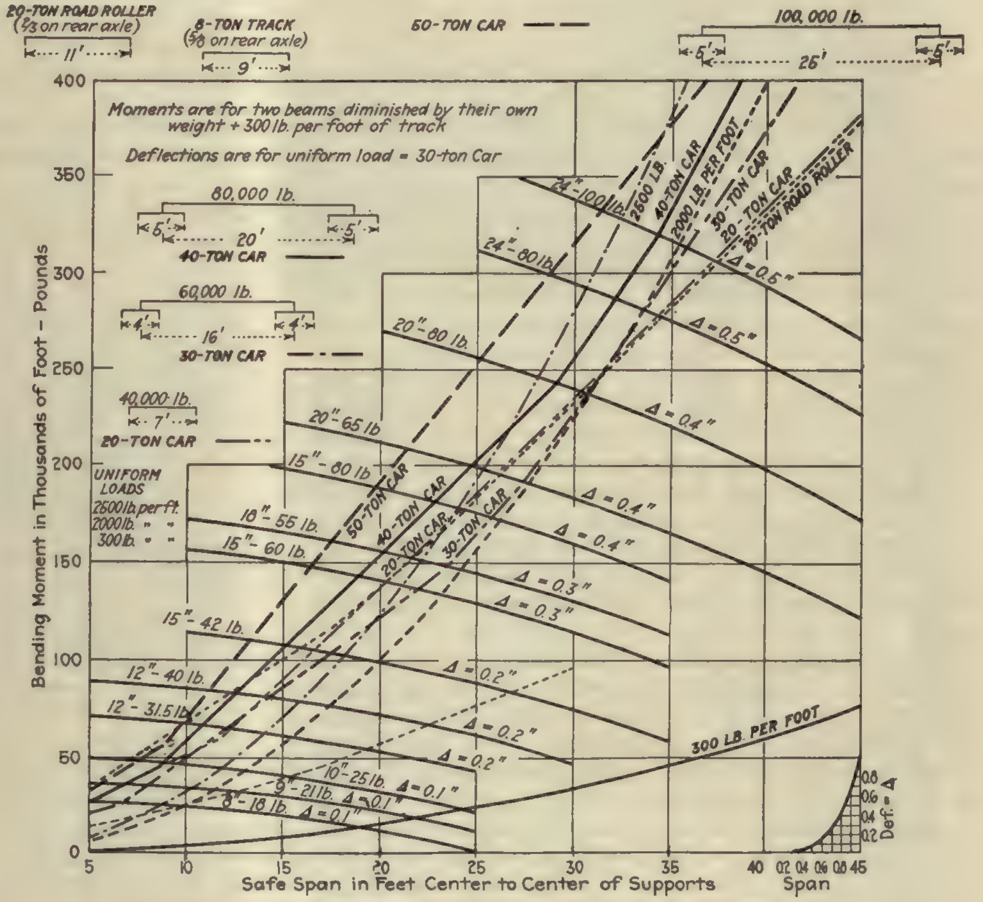
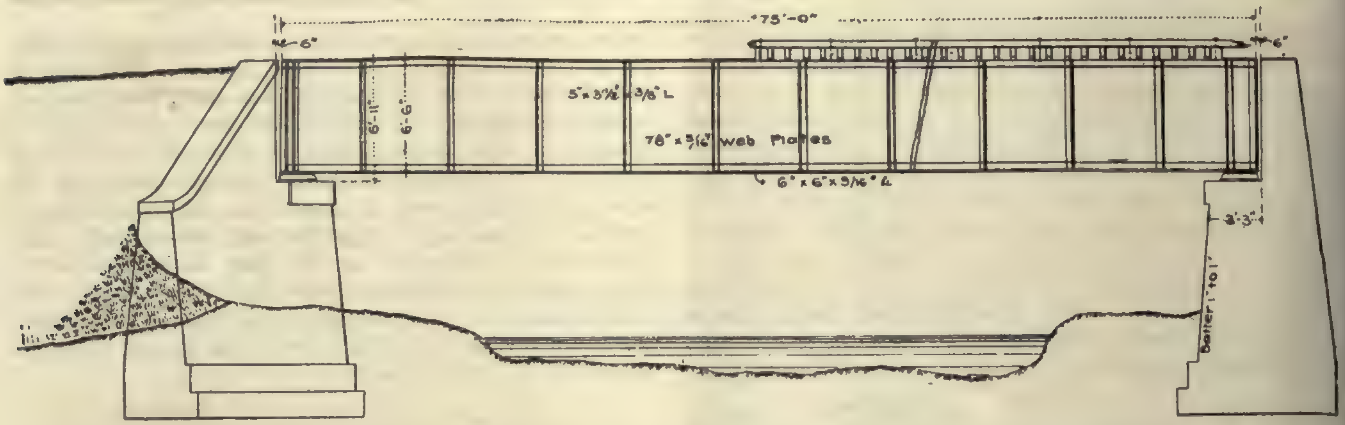


DIAGRAM SHOWING LOADS FOR I-BEAM STRINGERS

Electric railways frequently cross highway bridges which were built before the railways. Consequently the design of such bridges did not contemplate railway use. In placing tracks upon them various methods have been adopted which are not now considered desirable. In some cases it was necessary to rebuild the bridge, but more often only the floor system was altered and added to. In many instances, the construction used has been such as to render inspection and maintenance difficult.

Very often only one track is used and this placed as close as possible to one truss. Also it is seldom found that adequate provision was made, in replacing the plank flooring, for the security of a derailed car. Inside guard rails are seldom found on such bridges although they will be found universally upon steam and electric railway bridges.

During the time since tracks were first placed on highway bridges it has often been necessary either again to strengthen the floor system, or completely to rebuild the structures to provide for heavier equip-



ELEVATION

A 75-FT. DECK-TYPE, PLATE GIRDER BRIDGE, UNION TRACTION COMPANY OF INDIANA

ment. Such work has frequently led to controversies with the civic authorities over the apportionment of expense. Arguments often arise over assumption of maintenance expenses for the structure as a whole and authorities in charge are very often unappreciative (to say the least) of their responsibilities in connection with bridge maintenance. It is no infrequent occurrence to see a highway bridge brightly glowing in a resplendent coat of fresh paint, but applied over rust and dirt and all above the floor. The under parts of the structure will be passed by somewhat in the spirit of "out of sight, out of mind" despite the fact that it would be best if the procedure were reversed because the under parts need cleaning and painting much more than the upper portions which are exposed to the action of wind and sun. Such conditions, when found by the maintenance engineer, require tact and patience and constant endeavor to have the authorities realize their duties.

When highway structures carrying railway tracks fail, as they sometimes do, an attempt is not infrequently made to place responsibility for the inadequacy of the structure upon the railway. For this reason alone the engineer of the railway should be in possession of all possible information relating to such bridges crossed by his lines, and the best way to secure this is through inspections, preferably made by a consulting bridge engineer, since the reports of consultants will have more weight with investigating authorities as a rule.

### ELECTRIC RAILWAY BRIDGE FLOORS AND DECKS

Electric railway bridges generally have floor systems and decks which closely follow steam-road bridge practice, but where highway bridges are crossed a great variety of floor systems and decks are encountered. Space will not permit the discussion of the latter in this article, to the extent which the subject deserves. It will suffice to note that where timber highway bridge floors are found, the under course of planking should preferably be of creosoted timber and, whenever possible in renewing plank floors, creosoted timber under decking and, whenever possible, creosoted wood block wearing surfaces should be substituted in the interest of economy. The greater number of highway bridges as now built which call for wood floors make provision for a wood block wearing surface, as it is well known that a 3-in. or 4-in. wood block surface will outwear an ordinary plank surface several times over.

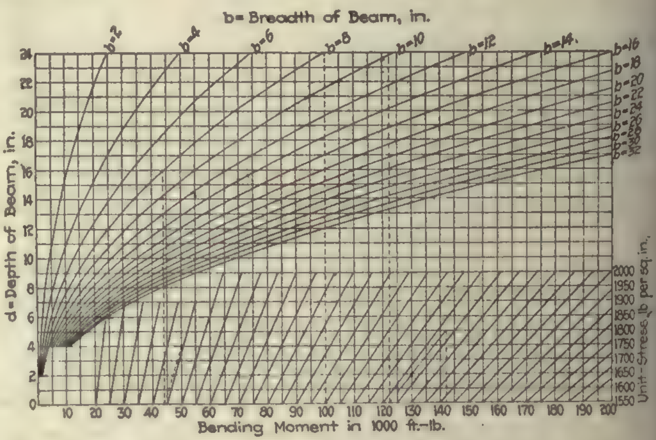
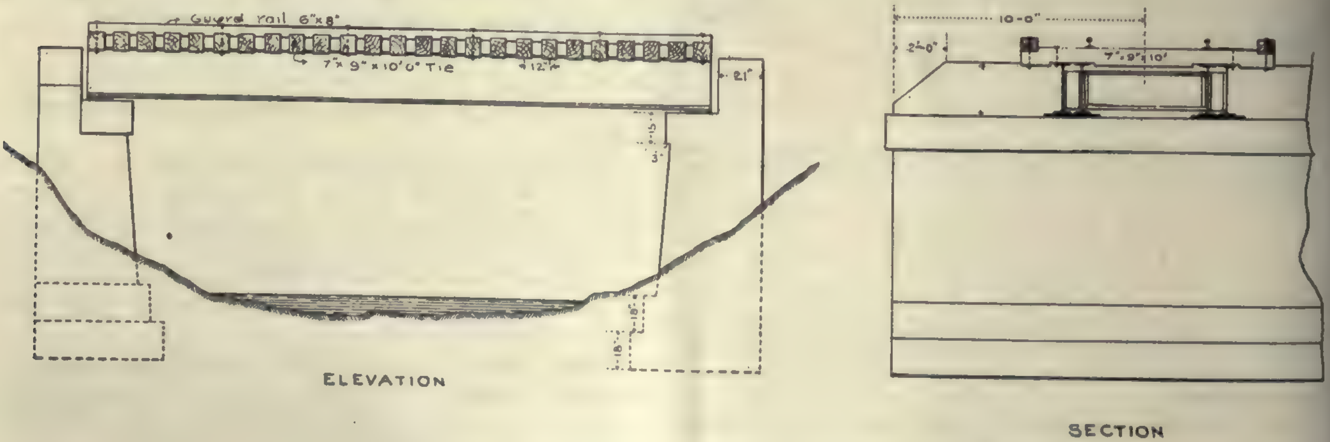


DIAGRAM FOR DETERMINING STRENGTH OF WOODEN BEAMS



A TYPICAL I-BEAM SPAN, UNION TRACTION COMPANY OF INDIANA

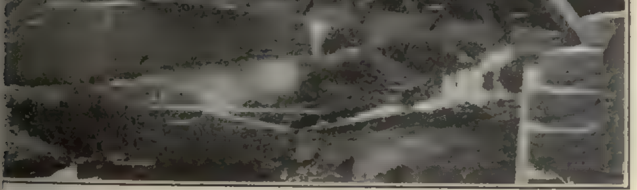
### BRIDGE RECORDS ARE VERY USEFUL IN MAINTENANCE WORK

Bridges are constantly being referred to in main- nance correspondence. The general manager often shes to know whether a foreign car will operate fely over the road. The freight department needs milar information as to acceptance of steam road eight cars. The bridges on the road usually present me limiting features the details of which should on hand for ready reference in such cases. Clearance d strengthening problems, and addition and better- ent matters, are continually arising, and these call r prompt and accurate information without waiting r field investigation. For these reasons it has been und advisable to have records at hand which will ve all data ordinarily required, and the expense r obtaining the field information and preparing and vising the records will be found very small in com- rison with their value as aids in connection with idge maintenance problems.

Before outlining some of the features of bridge cords it may be well to note that such records must revised annually, so that they will be representative existing conditions, by including all changes in ructures which have been made during a season. An correct record is worse than none, since if no informa- on is at hand it will be necessary to go to the bridge d get it.

Bridge records comprise two general features: (1) he field inspection record and (2) the condensed office cords. The field inspection record consists of the llowing:

(A) *General Information*—as to the following items— ) Location of bridge and what is crossed; (2) date inspection; (3) type of bridge and use (whether ilway only or highway); (4) number and location of acks (eccentric location may be a serious matter); ) skew, if any; (6) alignment and grade on bridge d on approaches; (7) distance from floor to ground water below and depth of water; (8) factors which ight limit changes in structure such as nearness of her structures, highways, buildings, etc., and (9) clear pan and length over all.



TYPICAL SINGLE-TRACK PONY TRUSS ELECTRIC RAILWAY BRIDGE

(B) *Substructure*—Information as to kind and qual- y of substructure; general statement as to condition; pacing of bents or piers.

(C) *Superstructure*—Information as to style and material of structure; statement as to general condition, spacing of panel points; condition of paint; notation as to whether vibration was observed and where; arrangement of rivets at joints; connections of stringers to floor beams.

(D) *Floor*—It is important that full information concerning the floor should be recorded, such as kind, condition, size and spacing of ties, location and size of guard timbers; size and location of inner guard rails; arrangement of ends of guard rails and their extent beyond the structure; kind, size, condition, number and location of stringers; method of suspending floor beams from structure.

SINGLE TRACK THROUGH TRUSS ELECTRIC RAILWAY BRIDGE

The condensed office records consist primarily of a digest (see page 955) of the bridge engineer's reports, which should be filed in a loose-leaf binder and should show the division, bridge number, location, type of bridge, span, capacity of truss or girder; if a highway bridge, capacity with and without highway load; capacity of floor beams and stringers; limiting features; limiting load and restraining orders governing loads or operation on the bridge. In addition a diagram should be prepared for the entire road showing the location of all bridges with their numbers and indication of capacity of each bridge. Similarly a clearance diagram should be made up which will indicate those bridges where clearance for all types of cars used, is not provided.

#### SOURCES OF FURTHER INFORMATION

Matters pertaining to inspection of bridges are very well described in an article by Frank B. Walker in the JOURNAL for April 28, 1917; while a description by William R. Dunham, Jr., of the carefully prepared records of the Connecticut Company appeared in the JOURNAL for Feb. 26, 1916.

The subject matter here discussed has been gathered from many sources, principally from H. C. Keith's paper on electric railway bridge inspection and reports (1918 Proceedings, Brooklyn Engineer's Club); Willard's Maintenance of Way and Structures; the Manual of the American Railway Engineering Association and the files of the ELECTRIC RAILWAY JOURNAL. It may be said in passing that the writer spent many weary days in company with Mr. Keith on bridge inspections for the Connecticut Company, and as a result, has come thoroughly to realize the necessity for and importance of accurate detailed inspections of bridges used by electric railways.

# Compensation for Engineers

## Engineering Association Draws Up Schedule for Salaries of Engineers in All Industries

THE committee on compensation of the Chicago Chapter of the American Association of Engineers has submitted to that chapter for consideration a schedule of salaries for engineers employed in various industries among which is included the electric railways.

In submitting this report the committee recommends that the data and schedules submitted be utilized in a nation-wide study to formulate a comprehensive schedule, that the national association secure abstracts of the laws of all states, and of the United States, as applicable to engineers and surveyors and their work and that these be published in leaflet form and given the widest possible circulation, accompanied by suggestion for improvement in these laws.

That part of the schedule which affects electric railway engineers recommends that for an electric railway with an equivalent of 60 miles of track the schedule of salaries be as follows:

| | | |
|---|---|---|
| Chief engineer | In charge of track, structure and transmission lines | $3,600–$4,800 |
| Assistant engineer, field | Doing transit work and inspection. Under direction | 2,400– 3,000 |
| Roadmaster | Preferably technically educated man | 2,400– 3,000 |
| Mechanical electrical engineer | A trained engineer in both branches having charge of power house, plant, cars and equipment | 4,200– 5,400 |
| Office engineer | Equivalent to a first-class machine draftsman for work under direction | 2,400– 3,000 |
| Line superintendent | Not easy to describe, but position commonly understood | 2,400– 3,000 |
| Substation men | Duties as commonly understood | 2,400– 3,000 |

The schedule recommended for an electric railway with the equivalent of 200 miles of single track is as follows:

| | | |
|---|---|---|
| General manager | Responsible for all operation and maintenance. Preferably a technical man | $6,000–$10,000 |
| Chief engineer | Has full charge of construction and maintenance of way and structures | 4,000– 5,400 |
| Assistant engineer | Drafting and instrument work in field and office under direction | 2,400– 3,000 |
| Roadmasters | Preferably technical men | 2,400– 3,600 |
| Electrical mechanical engineer | Trained in mechanical and electrical engineering and in full charge of power house, transmission and equipment | 4,500– 6,000 |
| Assistant engineers | Perform drafting and design under direction | 2,400– 3,000 |
| Line superintendent | Preferably a technical man. Training for higher position | 2,400– 3,000 |
| Substation man | Duties as commonly understood | 2,400– 3,600 |

The committee also makes recommendation as concerns engineers on the staff of the State Public Utility Commission as follows:

### SALARIES FOR COMMISSION ENGINEERS

Proposed schedule of salaries for Engineering Department of State Public Utility Commission, for a state with a population of 5,000,000:

Chief Engineer ........................ $12,000 to $15,000

Such an engineer would be charged with the administration of the engineering department and engaged on valuation work, standards of service, inspections and investigations having engineering aspects, etc. He may or may not be assigned the duty of hearing cases, preparing opinions, etc. During his employment by the commission and for one year thereafter he should accept no employment from any utility subject to the jurisdiction of the commission.

| | |
|---|---|
| Assistant chief engineer—acts as assistant to chief engineer | $9,000–$10,000 |
| Chief of railroad division | 8,000– 9,000 |
| Chief of gas division | 6,000– 7,500 |
| Chief of telephone division | 6,000– 7,500 |
| Chief of water works division and mechanical engineer | 6,000– 7,500 |

The above chiefs of departments are directly engaged on the valuation of public utilities within their own division, assisting in formulating standards of service and engaged on investigations and inspections having engineering aspects. They may or may not be assigned the duty of hearing cases, preparing rate schedules, opinions, etc. During their employment by the commission and for six months thereafter they shall accept no employment from any utility subject to the jurisdiction of the commission.

Chief of Service Division.................. $6,000 to $7,500

A chief of service division would be engaged in the enforcement of standards of service and in investigations and inspections having engineering aspects. During the employment by the commission and for six months thereafter, he shall accept no work from any utility subject to the jurisdiction of the commission.

Assistant engineers reporting to the chiefs of the above departments should be graduates of technical schools or with equivalent technical knowledge.

| | | |
|---|---|---|
| Grade 1. | Corresponding to a division engineer on a railroad in training and ability | $3,600–$4,800 |
| Grade 2. | Corresponding in training and ability to an assistant division engineer on a railroad | 3,000– 3,300 |
| Grade 3. | Corresponding to instrumentman on a railroad | 2,400– 2,700 |
| Grade 4. | Corresponding to junior draftsman or junior instrument man on a railroad | 1,800–2,100 |

# Convenient Rack for Air-Brake Hose

A RACK constructed of 1-in. pipe, with the necessary T's and elbows, is in use at the Southern Division inspection and overhauling shop of the Brooklyn Rapid Transit Company, for holding and storing air-brake hose. The bottom of this rack is built solidly into the concrete floor and forms a very solid and substantial type of construction, as well as one which will not accumulate dirt and dust, common to all inspection shops.

AIR-BRAKE HOSE RACK CONSTRUCTED OF PIPE

The width of the rack is made just sufficient so that the coupling and nipples on the end of the hose will project outside. Three cross-pieces of pipe extend the length of the rack on which the various types of hose are laid. Each type of hose is kept separate for convenience and to assist the repairman in obtaining the proper hose without the necessity of looking through a large number of pieces. By locating such a rack in a place convenient to the inspection pit, much time and labor is saved to the repairman.

# Steel-Tired Wheels and Axles

## The Author Discusses Methods of Installing Wheels and Axles and Gives Special Attention to the Causes of Sharp Wheel Flanges — Good Track Maintenance Is Declared Essential to Good Car Life

By H. VERNON
Belfast (Ireland) City Tramways

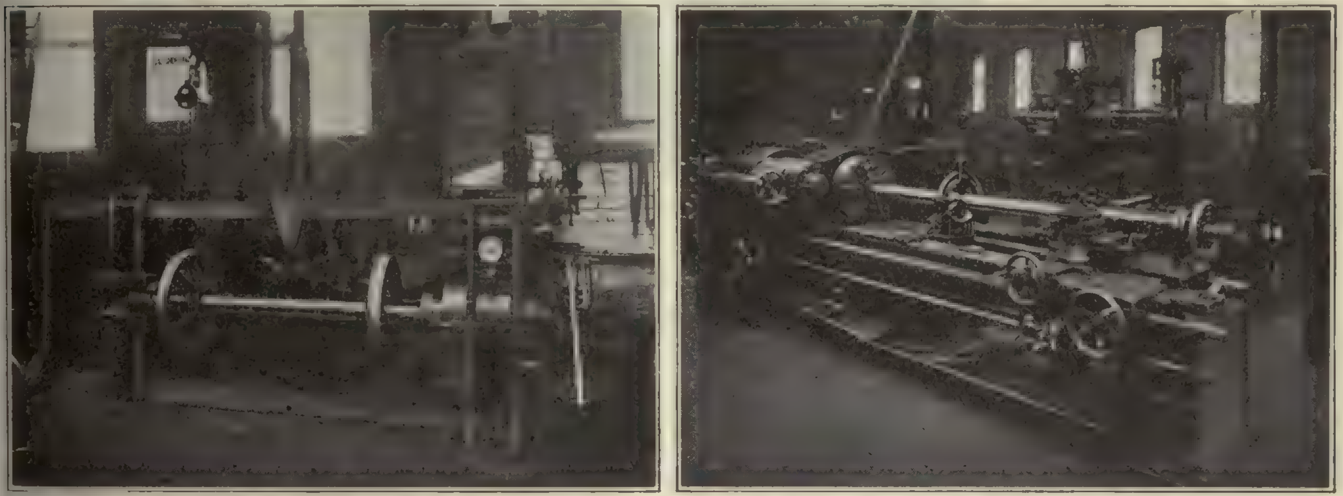
ALTHOUGH it cannot be asserted with reason that the inspection and maintenance practice of all tramways should be uniform, there are certain principles that can be followed by them. In comparing the life of axles and tires on one system with those obtained on others over an experience of thirteen years, we generally find that such comparisons are of little value, so many factors operating which may entirely vitiate the result.

We believe that there is but one test to apply to a steel axle or tire—the test of service. We make every effort to see that they are correctly fitted and exactly to gage before they are sent into service, not only to do justice to ourselves but also to the makers of the material. Our 4-in. axles are manufactured to the British standard specifications. We purchase them from the makers in the rough and machine them to suit our requirements.

The problem of holding car wheels on their axles is met by boring out the new wheel hub slightly smaller than the diameter of the axle, and forcing the wheel on in a hydraulic press. In turning the axle, we leave the wheel seat 16/1000 in. (by micrometer) larger than the bore in the wheel, giving the axle a slight lead for about ½ in. This usually gives us a pressure of about 10 tons per inch of axle diameter at the wheel seat. We have found it an advantage to make a radius of about ¼ in. in the leading end of the bore in the wheel, so that there is not the danger of the sharp corners of the hub pinching the axle when they are taking curves and loops. As our standard wheel fit is 4 in. in diameter by 4½ in. in length, and the pressing allowance is 16/1000 to 23/1000 in. by micrometer, the maximum pressure on a 4-in. axle is 45 long tons.

Before axles are fitted, the journals and wheel seats are finished off in the lathe, by means of three hard steel rollers held in a steadyrest, which is bracket-supported and fitted to the lathe carriage. These rollers are hard-pressed against the wheel seat and fed along. We find that rolling and burnishing greatly improves the fitting of axles.

In forcing the axles into position, we use neat's-foot oil as a lubricant on the axle surface. It has been found that oil helps to prevent the corrosive action of the surfaces, which action increases the difficulty of starting the hubs when it is necessary to take them off. We have also found that 10 tons per inch of axle diameter does not always work out satisfactorily for all cases of pressed fitting, as both hubs and axles vary considerably in hardness. Some axles take 11 tons per inch to fit them; others less.



HYDRAULIC PRESS IN BELFAST CITY TRAMWAYS SHOPS AT LEFT, FINISHING OFF JOURNALS AND WHEEL SEATS ON CAR AXLE AT RIGHT

The question of pressure is not the only factor to be considered. The effects of the length of the axle fit, of the amount of metal around the bore, of the kind of metal and of the smoothness of the surface of both the bore and axle are also important. But the more care we take with the finishing of hubs and axles, and the smoother we make the fit, the less trouble is there in fitting them. We exercise great care in seeing that the wheel hubs are properly spaced on the axle. It is not sufficient that they be spaced to gage. They must be spaced at equal distances from the center of the axle in order to have proper end play for the motors. When wheels are pressed on it is difficult to stop the action of the press at the right moment, but by an arrangement of hollow blocks which fit over the axle, and a horseshoe cast-iron wedge regulated by a fine-pitched screw set in between the blocks, we gage them correctly.

Allowance must also be made for the closing in of the spoke type of wheel centers. To compensate for this springing action, the wheel centers are pressed onto the axles $\frac{1}{16}$ in. less than the standard gage. Every wheel is numbered, and the same number is stamped on the axle, together with the date it was pressed on and the pressure shown by the gage. This number is recorded and filed for ready reference.

### TIRE PRACTICE

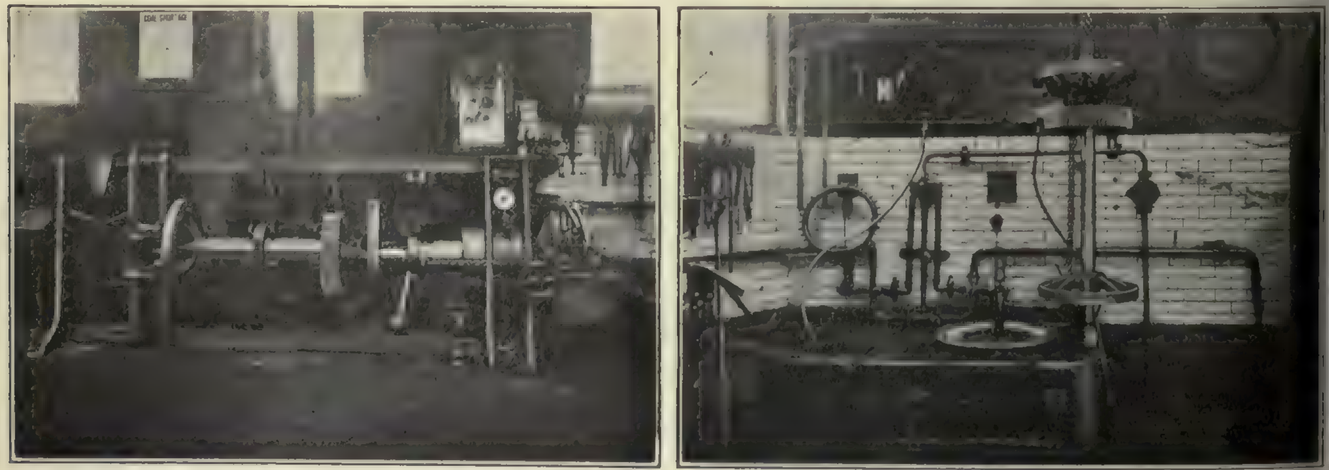
Our tires, which we purchase in the rough from the makers, are made of Siemens acid steel. They are stamped with the maker's name and serial number in $\frac{3}{8}$-in. letters in such a manner that each tire may be readily identified. When new, they weigh about 220 lb. and are rolled with a 1 in. in 20 in. taper of tread. Before shrinking on, we carefully pair and caliper them so as to get equal diameters. The heating of tires by gas is done in a furnace of simple design which we specially constructed for this purpose. It consists of three 2½-in. seamless hydraulic tubing rings, each of which is fitted with a row of gas jets or burners extending around it, placed horizontally so as to cause the flame to impinge upon the tire. The supply of gas and air to the burners is regulated by separate valves. In connection with the expanding ring for taking off worn-out tires, a cast-iron ring is provided with a flange over the burners to protect them from injury during the process of lifting wheels and axles in and out of the ring.

WHEEL LATHE FOR TURNING STEEL-TIRED WHEELS

A light overhead traveling crane is erected over the furnace by means of which, when the tire is at the proper temperature, the wheels and axles are lifted automatically and the bottom wheel is lowered into the tire.

The 220-lb. tire is heated until its internal diameter is $\frac{3}{64}$ in. larger than the wheel center. The temperature of the tire reached by this heating is approximately 500 deg. Fahr.

During this period the old tire is being expanded until it slips off the wheel center. Our worn-out tires weigh on an average 70 to 75 lb., and they slip off the centers when heated up to about 300 deg. Fahr. Expanding a tire off and shrinking another on is performed in 15 minutes. We can take off two old tires and shrink on two new ones at a cost of 2 shillings. A water-cooling service is supplied for cooling off the tires on the wheel centers. All wheels are gaged outside their rims at four points equally spaced on the circumference. If there is more than $\frac{1}{16}$ in. of variation, the wheel rims are faced up true in the lathe before tires are fitted. The average life of our most successful make of tire used, up to the present, is 70,000 miles. During the life of a tire only about 50 per cent of its weight is worn away, 20 per cent is turned off in forming flanges and the rest is scrapped. Flange wear is one of the most important items we have to contend with, and all our efforts are directed toward saving the wheel flanges. Since we are able to use roughly about one-half the weight of the tire the problem of getting the longest life out of a tire before turning calls for careful study. Danger of car derailment at curves and heavy side oscillation generally sets the limit for flange wear. Although on some systems limit flange wear gages are used, we believe that while this may be a more desirable method and a means of saving tire metal if properly carried out, it has the disadvantage of demanding a larger number of spare cars or trucks and also wheel lathes in order to insure proper results. There are many causes which contribute to flange and tire wear. Generally speaking, they may be enumerated as follows:

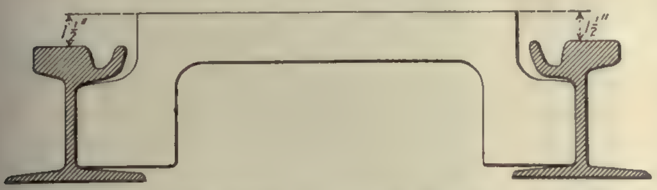


METHOD OF GAGING POSITION OF WHEEL ON AXLE IN PRESSING AT LEFT, APPARATUS FOR EXPANDING WHEEL TIRES AT RIGHT

1. The difference in diameter of wheels on the same axle, brought about by a difference in the quality of the metal or a difference in brakeshoe pressure.

2. Uneven shoe and wheel wear in the case of a common form of brake rigging where it is necessary to put the pivotal point, which does the equalizing between the opposite wheels on a brake beam, a little to one side of the center of the beam.

3. Tendency of a wheel flange to crowd the rail and become sharp as soon as one wheel has worn smaller than the other.



GAGE FOR DETERMINING CAR CLEARANCE OVER TRACK

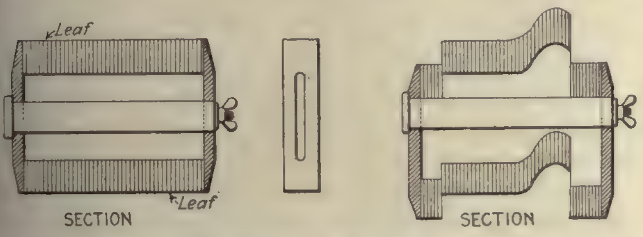
4. Sanding one rail only.

5. Running cars always in one direction. Coning the wheels will lessen the effect of such operation, but if the wheels are coned too much the cars are liable to rock.

6. Trucks out of square, propelling the cars from one side of the axle (single reduction rigid gearing) is the cause of much side thrust on curves and switches, etc.

Flanged brakeshoes, because of their abrasive action, cause a lot of unnecessary flange wear. The method of releasing outside-hung brakeshoes by release springs attached to the brakebeams is the cause of much unequal wear, both to brakeshoes and tires. This condition grows worse as the tires and shoes get smaller because the spring tension is increasing all the time. The many sharp curves on the Belfast system contribute largely to rapid flange wear, but if the metals of the rails and tires had the same resistance, as near as possible, the great wear both on rails and tire flanges at curves would be diminished.

The track should be kept up to its highest state of efficiency, first for public safety and second for keeping down the expense of car maintenance and overhead work. The track is the foundation of the system. If the cars run smoothly it is because the track is kept in a good state of repair. If, on the other hand, the track is in poor condition, the effects are transmitted through the wheels to the whole car.



LEAF OR LAMINATED GAGE FOR MAKING TEMPLATES OF WHEEL TREAD AND TIRE

This gage is composed of a number of thin plates of copper about 1/64 in. thick with a slot hole in the center. The plates are clamped together by means of a flat bolt and two thick plates at the outer end. The bolt has a wing nut and washer for tightening up. In applying the gage the bolt should be left slack so that the ends of the plates may rest on the surface required to be taken. When the surface is properly covered the bolt is tightened and the gage is removed whereupon the true outline of the surface will have been secured no matter how irregular it may be.

In order to check the wheel tire wear, we have fitted a limit gage at the ends of the overhauling pits at each of our seven depots as shown above. This track clearance gage is fastened across the pit, and cars must pass over it. By this means, we are able to see exactly what clearance there is left between motor gear cases and the track.

When wheels have been taken out at the car works, we use a leaf gage for making templates of the tread and tire. From this we draw a curve which represents exactly the contour of the tire. By taking another which represents the original standard tire section, and placing it beneath the curve of the worn wheel in such a way that the two curves do not intersect, we can determine the exact amount of metal to be cut away for securing a proper flange. An accompanying illustration on this page shows the details of construction for this leaf gage.

The policy of concentrating all wheel, axle and gear work under one head who is made responsible for getting every mile consistent with safety out of the tires and other parts gives excellent results. All that our depot foremen are expected to do is to see that the wheels are worn to, but not below, the scrapping point. All cars whose tires have reached the scrapping limit are sent to our car works where they are carefully examined before being taken out.

The equipment for turning steel-tired wheels consists of a Hulse & Company's wheel lathe, which averages five pairs of wheels a day.

## New Grinder Helps to Keep Cars Running

EARLY last winter a new pit wheel-grinder was installed in the North Albany shops of the United Traction Company, Albany, N. Y. This machine is similar in construction to that described in the Aug. 17, 1919, issue of the Electric Railway Journal, page 277. The grinder has been placed in a special pit under one of the tracks in the car shop and is arranged for electric-motor drive. It has been found that with two men operating this machine the average flat spots found in a pair of wheels can be ground out in from twenty minutes to thirty minutes. A set of four wheels can be ground in one hour and eight wheels in two hours or less.

It is seldom that all the wheels under a car are flattened at the same time. Hence, for most cars one-half to one hour's work is found sufficient to put them in satisfactory running order again. Previous to the installation of this grinder when a car was taken out of service for flat wheels it might not be able to return again for several days.

The new machine is supported on the right and left sides by strong cast-iron frames and is arranged for two emery wheels which can be moved up or down or horizontally by means of screws. After a car has been run over the pit it is jacked up and sections of rail are removed to permit the wheels to drop down onto the emery wheels. The workmen wear goggles during the operation and the particles of steel and emery which fly from the damaged wheel go into a steel box from whence they are drawn off through pipes by fan motors, thus keeping the working space free from dust. During the grinding operation the car wheels are turned very slowly by applying power to the motors in the usual manner.

The time and labor saved by this new device is very great, cars are returned to service much sooner and the company's engineers believe it has already paid for itself.

# Some Mysterious Car Ailments

## Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

### Applying the Brakes in Starting a Car

One line of an electric railway was experiencing considerable trouble due to the blowing of circuit breakers. There were no excessive grades on this line and the engineers of the company were somewhat puzzled to find a reason for such a phenomenon on one line while everything was apparently satisfactory on the others. Accordingly a man was detailed to watch the operation of the cars.

He discovered that there was a section of track which was very slippery and that the motormen had trouble in starting the light-weight cars at this point. They had received instructions to accelerate rapidly, which to them meant operating the controller rapidly. On this particular section of track it was the practice to notch up the controller very fast, and when the slipping point of the wheels had been reached to apply the brakes to keep the wheels from slipping. The reverse of this method was also found to have been applied in stopping the cars. The brake application produced a very rapid rate of retardation, and when the slipping point of the wheels was reached power was applied to prevent the wheels from skidding.

### Preventing the Burning Out of Reversers

ON A CERTAIN electric railway property using electro-pneumatic control equipment the reversers which were installed underneath the cars were frequently burned out. The motormen operating this type of equipment were questioned and insisted that they were not abusing the equipment in any manner and that these burnouts occurred while the car was running along normally. Special investigations by the engineers of the manufacturer and the railway forces showed that it was possible for the reverser to throw entirely independent of the motorman, due to foreign matter lodging on the valve seat of the opposite reverser magnet valve, or due to false circuits caused by an accumulation of dirt and dust. These reversers were not designed to break or open the circuit, as the contacts were not provided with blowouts, and the construction was such that a violent short-circuit would occur whenever the circuit was opened on the reverser contacts. The magnets controlling the air supply to the air cylinders were cut out after the circuit for throwing the reverser was completed and the reverser had been thrown to its proper position.

In order to overcome this trouble and to eliminate any possible chance of the reverser throwing, the manufacturer has changed the connections so that the reverser magnet is now energized all the time that power is on. This change has been extended to the control equipment for both two and four-motor equipments and has reduced the number of burnouts considerably.

### Coaxing a Multiple-Unit Equipment to Go Ahead by Reversing It

A CAR equipped with type-M control operated on a line having a loop at either end so that the car was operated from one end only. Its operation was satisfactory in this way, but one day there was a block on the line which required the turning back of the car from the downtown section. The motorman changed ends, threw his reverser and operated the car through the crossover and to his first stop satisfactorily, but when he tried to start the car again there apparently was no power, as the car would not operate. The motorman examined all his fuses and gave a rapid examination of other parts which apparently were all in satisfactory condition. He threw his reverser to the reverse position, then ahead, and applied power again and the car started satisfactorily. At the next stop the same condition occurred and when the motorman again operated his reverser the car worked O.K. He was forced to repeat this operation at each stop until he reached the end of the line. The car was then "shopped" for a closer inspection. All circuits were tested out with a bell circuit and they all rang out correctly. A blueprint of the connections was consulted for a possible solution, but still the trouble could not be located. The car was then turned over to the general "trouble man" with instructions to "stick to the job" until he had located the cause of the trouble. The cover was removed from the reverser and all fingers were tested and found to have the proper tension. All contacts were also found to be bright and free from dirt. On a very close examination, however, it appeared that one of the fingers was not touching the contact properly when the reverser was in the forward position. The reverser was operated several times, and it was discovered that there was a screw at that point which had loosened slightly so that the head projected above the contact surface. By watching the operation of the reverser, it was noticed that after it had been thrown from the reverse to the forward position the drum dropped back a trifle so that while in the first position the finger made proper contact, and when the drum had dropped back it rested on the head of the screw. The screw was then tested out in its loose position and it was found that the circuit would not ring to the contact plate. The screw was then driven in tightly and the equipment operated satisfactorily. The screw in its loosened position had held the finger from making proper contact. After the slight play in the reverser had taken place, which occurred each time the power was shut off the control circuit, the finger would ride up on the head of this screw. The seat for the screw was imbedded in insulation so that with this loose there was no contact for the current.

## Accurate Resistance Tests Locate Trouble Where Inspection Fails to Do So

A CONSIDERABLE amount of trouble was experienced on a certain series of surface cars which were equipped with tapped-field-control motors and multi-unit control for two-car train operation. In the most severe cases motors flashed and the control contactors were welded in. In milder cases cars were reported for being "fast" or for armatures which were baked or open-circuited.

The tests commonly made by shopmen were applied at the inspection shops in an endeavor to locate the trouble but in vain, so a special investigation was started by the railway's engineers. In this detailed investigation resistance readings were taken of the fields of the various motors by means of a Queen dial "decade" testing set which measured the resistance of the field windings accurately. These readings showed that in the tapped-field position some motors were running with but 10 per cent of the full-field winding instead of 65 per cent, as was intended. The reason for this condition can best be understood by referring to the accompanying diagrams.

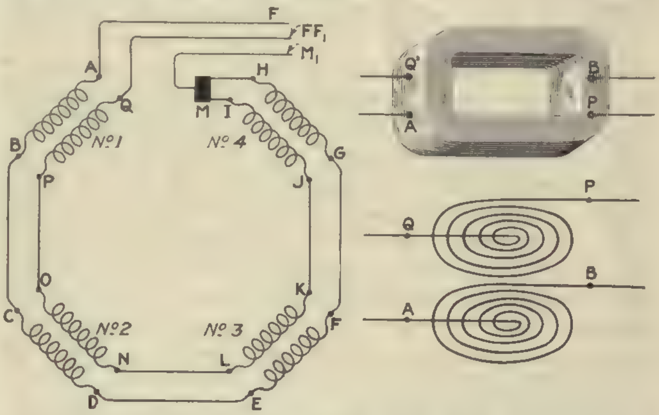
The first of these gives the schematic connection for the field windings of this particular type of motor. When operating on full-field position the circuit through the field windings would be from the terminal $F$ through the windings $AB$, $CD$, $EF$ and $GH$ to $M$ and then through the windings $IJ$, $KL$, $NO$ and $PQ$ to the $FF_1$ terminal. On the fifth and ninth positions of the controller, connections were made so as to cut out the first four windings just enumerated. In this position the field circuits started from $M_1$ and included only the windings $IJ$, $KL$, $NO$ and $PQ$.

A second illustration shows an individual field coil with two terminals on each end. For the sake of clearness the windings as connected to the terminals are shown outside and below the field coil. Each field coil is made up of two distinct windings, there being no connection at all between the sections $AB$ and $PQ$. The resistance of the winding between the terminals $A$ and $B$ is 0.018 ohm and between the terminals $P$ and $Q$, it is 0.033 ohm. Using these values for the resistance of the various windings and referring again to the first diagram it will be seen that the resistance of the four windings from $F$ to $M$ is four times 0.018 ohm or 0.072 ohm, and the resistance from $M$ to $FF_1$ is four times 0.033 or 0.132 ohm. When operating in full-field position the resistance will then be 0.132 + 0.072 = 0.204 ohm. The action of the contactors in passing from the full-field to the tapped-field position cuts out 0.072 ohm or 35 per cent of the field windings, leaving 0.132 ohm or 65 per cent.

TABLE FOR LOCATING POSITION OF TROUBLE FROM RESISTANCE READINGS

| Resistance in Ohm | From | To | Condition of Fields |
|---|---|---|---|
| 0.204 | $F$ | $FF$ | O. K. |
| 0.072 | $F$ | $M$ | |
| 0.132 | $FF$ | $M$ | |
| 0.051 | $F$ | $FF$ | First or second field shorted. |
| 0.102 | $F$ | $FF$ | Second or third field shorted. |
| 0.153 | $F$ | $FF$ | Third or fourth field shorted. |
| 0.204 | $F$ | $FF$ | No. 1 field reversed. |
| 0.087 | $F$ | $M$ | |
| 0.117 | $FF$ | $M$ | |
| 0.204 | $F$ | $FF$ | No. 2 field reversed. |
| 0.102 | $F$ | $M$ | |
| 0.102 | $FF$ | $M$ | |
| 0.204 | $F$ | $FF$ | No. 3 field reversed. |
| 0.117 | $F$ | $M$ | |
| 0.117 | $FF$ | $M$ | |
| 0.204 | $F$ | $FF$ | No. 4 field reversed. |
| 0.133 | $F$ | $M$ | |
| 0 072 | $FF$ | $M$ | |

The trouble in the cases referred to was found to be due to two causes. First, in some cases a short-circuit had occurred between the two sections of some of the fields and secondly, some fields had been installed upside down and end for end which made the terminals come right for connecting but reversed the amount of resistance and the winding in the circuit from what was originally intended. In both of these cases motors would rotate properly, but as a wrong percentage of the field was being cut out in the tapped-field position trouble occurred. The severity of this depended upon the position of the field in the circuit.



AT LEFT, SCHEMATIC DIAGRAM FOR THE WINDINGS OF A TAPPED FIELD MOTOR; AT RIGHT, INDIVIDUAL FIELD COIL FOR A TAPPED FIELD MOTOR

In one case a short-circuit was found between $A$ and $Q$ so that in the full-field position the entire field windings would be short-circuited for this motor. In other cases short-circuits were found in field coils other than the first one in circuit. With a short-circuit between $BC$ and $OP$ the resistance between $F$ and $FF_1$ was 0.051 ohm instead of 0.204 ohm. With a short-circuit between $DE$ and $NL$ the resistance between the terminals $F$ and $FF_1$ was 0.102 ohm. By comparing these with the resistances that should have been indicated, the variation in the results will be understood.

In the cases where the fields were installed the wrong way around the resistance as read between the terminals $F$ and $FF_1$ would be correct, that is, 0.204 ohm, but the readings between $F$ and $M$ and between $FF_1$ and $M$ would vary as follows: First, if the No. 1 field coil was reversed, $F$ to $FF_1$ would be 0.204 ohm, $F$ to $M$ would be 0.087 ohm instead of 0.072 ohm and from $FF_1$ to $M$ would be 0.117 ohm instead of 0.133 ohm. If the second field coil was reversed the resistance from

$F$ to $FF_1$ would be 0.204 ohm, from $F$ to $M$ would be 0.102 ohm instead of 0.072 ohm and from $FF_1$ to $M$ the resistance would be 0.102 ohm instead of 0.133 ohm.

From the various readings taken the accompanying table was developed to show the various combinations of errors which occurred. By referring to this table it was possible to determine which one of the field coils was reversed from the results obtained by taking the resistance from $F$ to $FF_1$, from $F$ to $M$, and from $FF_1$ to $M$. The use of this table saved a great amount of trouble and enabled the work to be handled by inspectors who otherwise would not have been capable or dependable to locate the trouble by any other simple tests.

## Open Circuits Cannot Always Be Located by Inspection

A CAR was pushed to the terminal depot and the motorman reported that it had suddenly gone "dead." As there must have been an open circuit somewhere, the inspector started to find it. He examined all terminals, gave all the leads a pull to make certain there were no loose connections, examined the grid resistors for broken grids, brush-holders for broken brushes and all contact surfaces for poor contact, but everything appeared normal. A lamp cluster used for "lighting out" circuits was then tried and the open circuit was definitely located in the field circuit of No. 1 motor. As all connections appeared normal it was thought that the field was open-circuited. The field leads were disconnected and the field was tested out separately with the lamp circuit and it was found "O.K." One of the leads, however, was found to be open. Eventually this open circuit was located inside the terminal. When the lead had been soldered into the terminal the insulation had entered the end of the terminal also. A poor job of soldering and the movement of the lead had caused the strands to break off close to the insulation. The heat from the open circuit had melted the compound in the insulation of the wire so that it stuck tight in the terminal. To all appearance the connection was sound and even a hard pull on the lead could not dislodge it.

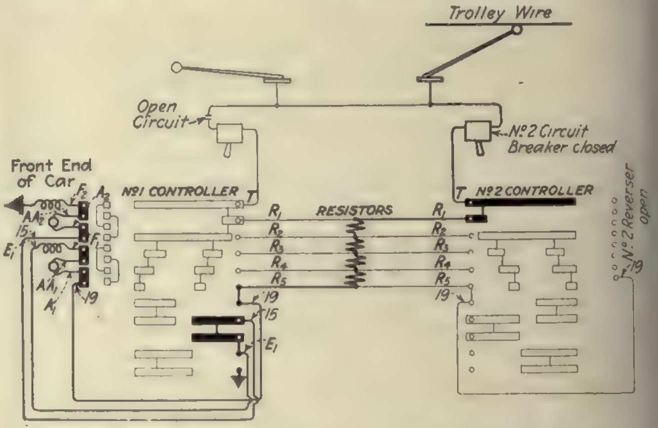
## Frequent Derailments Had a Reason

A VERY serious derailment occurred on a trestle of an electric railway system. The car derailed was a single-truck closed type and was one of fifty-six similar cars operated by the company. This particular car had been reported for a number of derailments at curves previously and apparently was the only one having trouble of this nature. While to all appearances this car was the same as the others of its class, still it was evident that there must be some uncommon condition existing on this car different from the others of this type to cause the trouble. In checking up the record of the car it was found that the derailments had started shortly after the car was last overhauled. This led to the theory that some of the truck parts had been improperly reassembled. The car body was jacked up from the truck, and all parts of the latter were carefully examined. The truck was a Brill No. 21 E with the motor suspension bars resting on springs fastened to the side frames by suspension bar bolts. The inside faces of the motors were bolted rigidly to the motor suspension bars. The ends of these bars were slotted to receive the bolts that secured them to the side frames and to permit limited end play.

Inspection showed that these motor suspension bars had been replaced with new ones at the last overhauling of the car and the new bars had not been slotted to provide for the necessary end play. As a result, derailments were frequent and one proved most unfortunate.

## Operating a Car from the Front Controller with the Circuit Breaker on That End Out of Service

DURING lunch hour at one of the shops of a large Eastern railway the men were telling of their various experiences in bringing in disabled equipment off the road. The controller repairman told of an interesting experience where the lead running from the trolley base to the circuit breaker had burned off. "Brought the car in by operating from the front end of the car where the lead was burned off and without making any temporary connections," he said. "How did I do it?" No one was able to tell how it could be done, so the controller man took them all out in the yard and showed them that it could be done.



SIMPLIFIED DIAGRAM OF CAR CONNECTIONS

The "stunt" used by the repairman is best illustrated by referring to the accompanying diagram, which shows simplified connections for the car equipment. The trolley pole on the rear of the car was used in the usual manner and the circuit breaker on the rear end was closed instead of the one on the front. Next the reverse drum in the rear platform controller was turned backward to an open-circuit position. This allowed the main drum to be operated and still kept the circuit to the motors open. The main drum of the rear controller was then placed in the first resistance position. Then by going to the front end of the car and throwing the reverse drum of No. 1 controller ahead and putting the main drum on the first point the motorman established a circuit from the trolley through the circuit breaker No. 2 on the rear end to the trolley finger in controller No. 2. From this $T$-finger current passed to the $R$-1 finger through the drum contacts of No. 2 controller and through the grid resistors to the No. 19 finger of the reverser in No. 1 controller. With No. 1 reverser thrown, current passed through No. 1 motor and through contacts $E$-1 and 15 to No. 2 motor and to ground. The circuit was thus established through the motors and the various steps of the resistors could be cut out as usual by operating No. 1 controller.

SECOND AND BROADWAY, GARY, IND., WITH SAFETY CAR IN FOREGROUND

# Safety Cars in Gary Make Jitneys Unprofitable

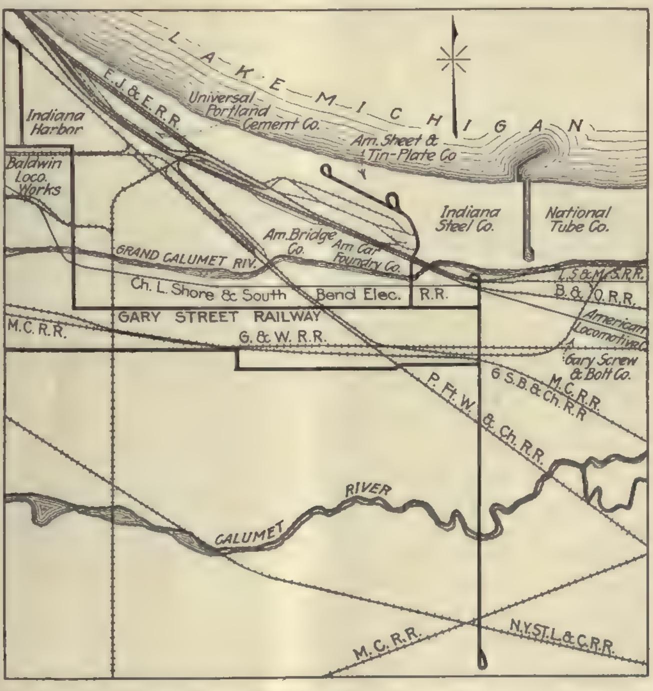
**The Gary (Ind.) Street Railway Installed Ten Safety Cars on Feb. 2 on Its Line of Heaviest Traffic and Increased Car-Miles by 62 Per Cent with Gratifying Results**

GARY, IND., is a city of 75,000 population. Within the city limits and surrounding territory are the United States Steel Corporation plants of the Indiana Steel Company, American Bridge Company and American Sheet & Tin Plate Company, and the plant of the National Tube Company under construction. These industries employ at present about 17,000 men and during the pre-armistice period employed approximately 21,000. During the past year the Gary Street Railway has ordered rolling stock to the extent of doubling its equipment due to the extraordinary war activity in its territory. Ten Birney safety cars were purchased. Of these eight were placed on the Broadway line serving the Indiana Steel Company. This company employs about 12,000 men and approximately 7000 of these are released at the street railway terminal at Second and Broadway between 5.30 and 6.00 p.m.

### JITNEYS REDUCED BY A THIRD

Safety-car service was inaugurated on Feb. 2, after a week's publicity work through the local newspapers. The men were trained on the Fifth Avenue line on cars operated without passengers. The new cars on the Broadway line completely equip it for ordinary service and replace five 23-ton double-truck cars. A headway of seven and one-half minutes had been maintained on this line formerly with the exception of the last few months, when it has been impossible to keep up the service due to a lack of men. As a result the jitneys secured an even stronger hold on the traffic than ever before and prior to Feb. 1 about 100 jitneys were operating on Broadway.

With the new cars the headway was reduced to five minutes during the day. During the rush hours from 5 to 9 a.m. and 4 to 8 p.m. this service is supplemented by two-man-car tripper service, further reducing the headway to three and one-half minutes. To-day but about sixty-five jitneys are operating with much reduced patronage.



MAP OF GARY STREET RAILWAY SYSTEM SHOWING SAFETY CAR LINE

### GRADE CROSSINGS ARE NO OBSTACLE

The Broadway line is straight for 5 miles and is double track for practically the entire distance, as is shown on the accompanying map. At one end it loops in front of the Indiana Steel Company's plant. Thence it passes through the heart of the business district of the city, extends beyond into what is considered one of the best residential sections of the city. Along the line are transfer points to all other lines. This line receives all classes of traffic amounting to an average of approximately 10,000 passengers per day. There are seven separate grade crossings on the Broadway line. Three of these are double track, main-line steam railroad crossings, one is a double-track electric interurban crossing and the others are single-track steam road freight and passenger crossings. These have not interfered with the service, however. The safety-car operator flags himself across by bringing his car to a stop, going upon the crossing and observing in each direction before proceeding, except during the rush hours when a flagman is stationed at each crossing.

### GARY CARS WEIGH 13,000 LB.

The cars used at Gary are the standard Birney type. They were furnished by the American Car Company. They are equipped with two GE-258 motors, K-63 control and General Electric air brakes, and Gurney ball bearings. The total weight is 13,000 lb. The platform for the trolley base as used on many of the safety cars is not used here but one a few inches high and built up especially in the railway shop has been installed so that a 14-ft. pole could be used. This was necessary to take care of the greater height of the trolley wire at railroad crossings. The cars are arranged for double-end operation.

INDIANA STEEL COMPANY EMPLOYEES BOARDING CAR AT SECOND AND BROADWAY TERMINAL, GARY

### BETTER SERVICE IS REFLECTED IN GREATER EARNINGS

In January, 1919, the last month under the old operation, the Broadway line operated 954 car-miles a day. In February with the new equipment this was increased 62 per cent, to 1,537 car-miles. The car-hours were increased 70 per cent. In spite of these increases, the power consumption was decreased 20 per cent including that used for heating the cars. The gross earnings increased 16 per cent, which is attributed entirely to the increased service resulting from the use of safety cars and if maintained will result in a net revenue gain of more than $40,000 per annum.

One of the safety cars was also installed on the Fifth Avenue line which operates to the plant of the American Bridge Company but this is used together with standard two-man cars. The headway on Fifth Avenue was reduced from twenty to ten minutes by the introduction of the safety car.

The men are pleased with the new cars for they receive a 10 per cent increase in their pay, making their wages approximately 50.6 cents per hour. The public and the city authorities are also pleased. The latter is indicated by the fact that when the Central Labor Union tried to get an ordinance through the council compelling the use of two men on the cars, due to grade crossings, etc., the proposal was immediately rejected.

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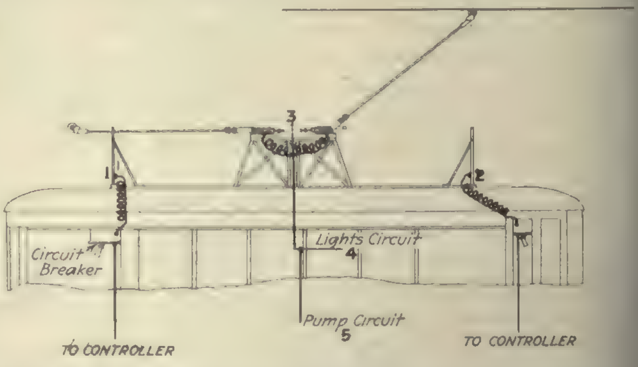
## Connections for Insuring Proper Position of Trolley Poles

BY C. H. COPLEY

Superintendent, Springfield Traction Company, Springfield, Mo.

PREVIOUS to the use of one-man cars by our system all our cars were equipped with one pole and were operated by two men. The changing of the trolley pole at the end of each trip was part of the duties of the conductor. When we changed to one-man operation considerable trouble was experienced due to the operator forgetting to pull down the front pole when changing ends. As a result, when the car was started up this front pole would catch in the overhead work and frequently tear the trolley wire down.

In order to make it necessary to pull down the front trolley pole before these cars could be operated, I arranged the wiring as shown in the accompanying diagram. With these connections it is impossible to operate the car unless the proper pole is on the wire. Instead of connecting circuit breakers to the trolley base these were connected to a hook at each end of the car. The two trolley bases were joined together by a jumper, and with the trolley pole on the rear end of the car in position on the trolley wire and the pole on the front end of the car under the hook, a circuit was established from the trolley wire through the rear and front trolley poles to the hook and then to the circuit breaker at the operating end.



METHOD OF CONNECTING THE TWO TROLLEY POLES OF A SAFETY CAR SO AS TO INSURE THAT THE FRONT TROLLEY POLE IS DOWN BEFORE THE CAR IS OPERATED

This method of connecting the trolley poles has been adopted as standard for all our lines and has now been in operation for six months. During this time no trolley wire has been pulled down, no poles have been bent, nor have any delays been caused to the service by the operator forgetting to place the right pole on the wire.

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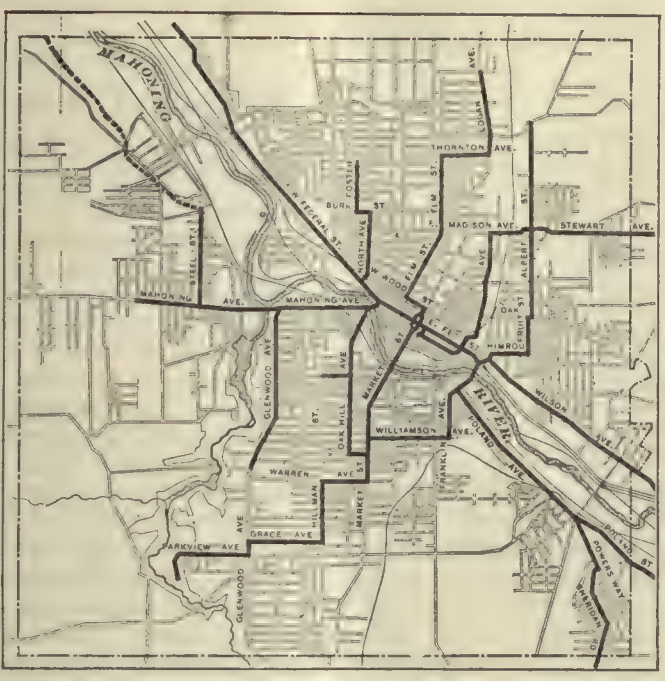
The United Railway of Yucatan has received three storage-battery passenger cars from the Railway Storage Battery Company for use between Merida and Progreso, 23.6 miles. The total weight of the car equipped and with storage batteries is about 37½ tons, and it seats sixty-six persons.

# Relieving Congestion at the "Diamond" in Youngstown

### Company and Transit Commission Are Co-operating to Reduce Time Loss and Accident Hazard at Central Square

As IN MOST cities, traffic conditions in Youngstown, Ohio, are complicated by the desire of the patrons to be brought directly to the business center, locally the public square or "Diamond." Unfortunately, this square is small, being but 365 ft. x 220 ft. from curb to curb. It is divided into two equal plots by Federal Street, permitting a figure-8 track loop. (See Fig. 1.) All city lines, *i.e.*, those of the Youngstown Municipal Railway, come to this point as well as all of the Mahoning & Shenango Railway & Light Company's interurban lines except the Sharon line. The accompanying diagram of the loop shows in solid lines the existing track, and the map shows the relation of the loop to the city lines.

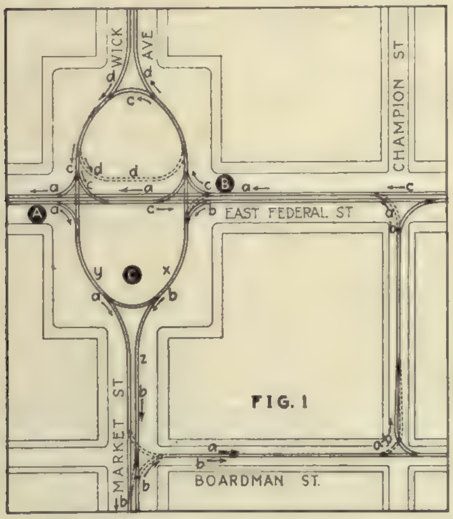


RAILWAY LINES IN YOUNGSTOWN, OHIO

All loading and unloading in the loop is done on Federal Street. The lines which enter at *A* and use the north section of the loop are Mosher, South Side, Ohio Works, Glenwood Avenue, Mahoning Avenue, North Avenue and Woodland, and Girard and Warren interurban. At *B* the following enter, using the north section: Albert Street, East Youngstown, Poland Avenue and Poland Street Railway, as well as the Newcastle interurban. During the rush hours eighty-four city cars (three with trailers) and twenty-four interurban cars (eight with trailers) go through the loop between 5 and 6 p.m., and in the half hour from 6 to 6.30 there are fifty-three city cars (two with trailers) and eleven interurban cars (four with trailers). The congestion during this period is obviously very great.

So much for the conditions at the "Diamond." The vital question to the company and to the transit commissioner, Hon. William L. Sause, is how to relieve the congestion. Some things have been done; others are in process or in contemplation. One plan is to minimize the time required for loading in the loop. On the Youngstown-Warren interurban line, where Peter Witt

NORTH SECTION OF CENTRAL SQUARE OR "DIAMOND," YOUNGSTOWN, OHIO front-entrance, center-exit cars are used, this is accomplished by opening both entrance and exit doors in the loop and not attempting to collect fares in the city limits as the passengers pass the conductor. On Feb. 1 under the direction of Mr. Sause the Park and Falls line, which reaches the loop by way of Market Street, was removed from the loop proper and arrangements were made to "wye" the cars at point *C*, Fig. 1, in the manner shown in Fig. 2. The cars proceed northbound to point *x*, Fig. 2, unload their pasesngers, back to point *y* without reversing the trolley poles, load at point *y* and proceed southbound. The main objection to this plan is that cars must back against street traffic in a section where traffic is congested, particularly during the rush hours. To prevent accident the city maintains extra traffic officers at this point.



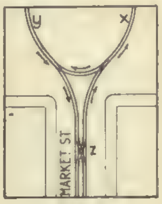


FIG. 2

FIG. 1. PRESENT AND PROPOSED TRACK AROUND THE "DIAMOND," YOUNGSTOWN

FIG. 2. "WYING," THE PARK AND FALLS LINE CARS, YOUNGSTOWN

Mr. Sause proposes to locate a double crossover at point *z*, Fig. 2, to permit northbound cars to proceed directly to point *b*, where they would unload, then backing to point *x* (with traffic) for loading. This crossover involves a cost of about $7,500 and it may be installed when finances permit. In the meantime no serious accidents have occurred at the "wye."

For ultimate solution of the "Diamond" problem, J. B. Stewart, Jr., superintendent of the city lines, proposes the extension of the loop to include East Federal, Champion, Boardman and Market Streets, as shown in Fig. 1, in which the necessary new track is indicated by the dash lines. Under this plan there are four routes through the business center as indicated by the arrows and lettering in Fig. 1. One group of lines (Mosher, North Avenue, South Side, Woodland, Ohio Works, Mahoning Avenue and Glenwood Avenue) enter via West Federal Street and make the large loop as indicated by the letter *a* and arrows. The second group contains the Park and Falls line, which "wyes" as now (see *b*). Group 3, which can be traced by letter *c* and arrows (East Youngstown, Albert Street, Poland Avenue and Poland Street Railway) enter from East Federal Street and round the northern half of the old figure 8. The fourth group contain the Elmwood line for which a new loading and unloading track is provided as indicated by letter *d*.

STANDARD CITY CAR, YOUNGSTOWN

The rearrangement described would cost possibly $75,000 and it is not expected to be feasible for some time.

## Institute of Metals on Condenser Tube Corrosion

THE Institute of Metals, of Great Britain, held its annual meeting in London near the end of March and received the fourth report of the corrosion committee. A quite important part of the report is concerned with the corrosion and the protection of condenser tubes. The report extends to great length, much research work is reported and many very technical points are discussed. The oral discussion by high officers of the British Navy and by condenser tube manufacturers added greatly to the breadth and scope of the treatment of the subject. But aside from the considerable prominence given to a preoxidizing process (in which it seems the Admiralty has long been interested) and the emphasis put upon the significance of full recognition by the manufacturers of their responsibilities during the making of tubes, seemingly nothing of commanding importance was brought out. Very little was conclusively established.

The methods used in the investigation and the tentative results presented appear not distinguished by practicality. From this aspect the whole discussion is far less impressive than the symposium on the cracking and corrosion of brass presented last June at the annual meeting of the American Society for Testing Materials. And indeed one of the most remarkable features of the British report is the lack of any reference to the really notable recent American work. It is true that in the oral discussion a British condenser tube manufacturer did refer to a change in his practice adopted because of American research work. And it is perhaps more interesting still to point out that this very change in his practice, the heat-treating of the tubes, has striking similarity to the means by which the preoxidizing process is effected, namely, the heating of the finished tubes in an oxidizing atmosphere for half an hour in the temperature range of 500 to 570 deg. Fahr. Recent American investigators feature annealing the finished tubes at temperatures somewhat higher than those just mentioned, and oxidizing has not attracted attention. The basic similarity, however, is striking.

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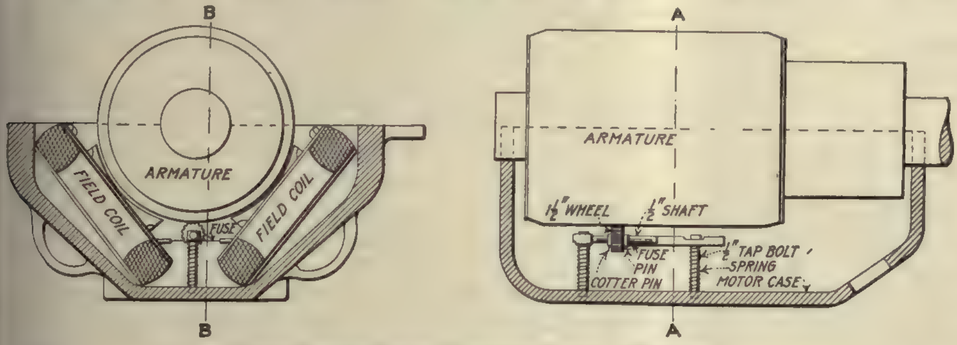
The Federal Board for Vocational Education reports on May 5 that among the disabled soldiers now undergoing the re-educational process there are twenty-four studying architecture; thirty, chemistry; twenty-one dentistry; fifty-eight, drafting; 178, engineering; two, foreign trade; nine, journalism; seven, languages; sixty-eight, mechanical drawing; eight, music; two, optical work; forty-nine, law; eight, teaching; four, theology; three, veterinary medicine; eight, wireless telegraphy.

## New Device Prevents Rubbing of Armature on Pole Faces

A PATENT has been issued to Walter B. Uffert, New York State Railways, Rochester Lines, Rochester, N. Y., for a device to prevent an armature from rubbing on the pole pieces due to worn bearings, sprung shafts, hot bearings or other causes. It can be installed in either the older types of motors or the more modern interpole motors.

The device as shown in the accompanying illustration consists of a small grooved brass wheel mounted so that it will rotate. The wheel is equipped with a side contact which will make contact on the under side with a bare field jumper. This jumper can be either a bare wire or a strip of copper as is necessary to meet conditions. When the armature clearance is reduced to a dangerous point the laminations of the armature will come in contact with the small brass wheel, causing it to turn, and make contact with the field jumper. The contact of the laminations of armature with the small wheel will ground the wheel, which in turn will ground the field jumper, burning this off, and opening the motor circuit.



FUSE BREAKING DEVICE FOR MOTORS

Three cars in Rochester, one in Syracuse and one in Utica, are equipped with this device. In Rochester there have been four successful tests, where armatures were saved. In two of the cases the bearings were worn out, one had hot armature bearings, and one had a sprung armature shaft. In all these four cases the circuit of the motor affected was opened and the armature saved without injuring the other motor connections. These tests took place in GE-54, GE-80 and GE-67 motors.

## Car Equipment Notes from Belfast

IN CONNECTION with the article on Belfast practices with "Steel-Tired Wheels and Axles," by H. Vernon, published elsewhere in this issue, the following supplementary notes made during January, 1919, may be of interest:

The steel-tired wheels now in use are of Baker manufacture, of 31¾-in. diameter, new, and 28½-in. diameter when retired after making 70,000 miles. With a 28½-in. car wheel the distance between the ground and the platform step is only 8 in. Axles are of ordinary steel, but heat-treated metal will be used when it becomes obtainable. Because of the poorer quality of gas obtained lately, it takes fifteen instead of twelve minutes to shrink on tires. British Westinghouse gears are now standard, but Belfast has always enjoyed long gear life, not more than 100 gears having been scrapped in the thirteen years of the Tramways' existence. This is an average of 0.026 gear per car per annum on the basis of 23,000 to 24,000 car-miles per car per annum.

Careful maintenance of bearings in line to avoid backlash is given as the secret of long life of gears so far as the user is concerned. Pinions recently delivered have been of unusually poor quality because of war conditions and average only nine months' life.

The standard trolley wheel is 4 in. in diameter and includes 1½-in. x ⅞-in. x ½-in. graphite bushings, both made by Fleming, Birkby & Goodall. The average wheel life is 6000 miles, of which 1000 miles is ascribed to the returning of the wheels. The flanges are restored to the original contour as soon as the grooves become too deep for safety in running under frogs and other special work. Trolley wheels are operated under a tension of 22 lb., the tension adjustment being definitely secured by a weight instead of spring regulation, which is considered less reliable. The graphite bushings are usually good for two wheels. For the motors, which are Westinghouse No. 200, 35 hp., Le Carbone brushes are used, Belfast's standard for thirteen years. Every car depot is provided with spring scales to see that the prescribed tension of 4 lb. to 5 lb. per square inch is maintained. The brushes average about six months life.

## Conserve Workmen's Time by Having a Place for Every Tool

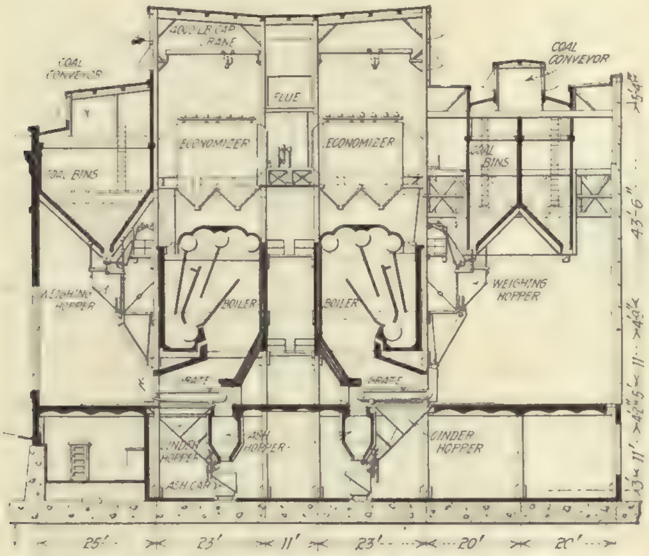
BOARD FOR SPECIAL WRENCHES AND LARGE TOOLS

THE many different special wrenches and large tools necessary in an electric railway shop for truck overhauling and where pit work is being done makes it a problem not where to put the tools but where to find them when wanted. In the shops of the Winnipeg Electric Railway much time of workmen has been saved by providing a tool board or rack for such tools in a convenient location. The front of this board is painted a light gray color and the exact outline of each tool is painted in black on the board so that the workman always knows where the tool belongs and can readily place it in its proper position. An accompanying illustration shows this board. No tools were on it at the time the photograph was taken. The brief instructions at the top of the board, "Bring it back," are very significant. They serve as a constant reminder to the workman every time he passes the board that tools have a proper place.

## New Furnace Design

### A Cleveland Company Puts the Stoker Under the Mud Drum in Order to Get the Desired Gas Flow

IN THE 1918 addition to the Lake Shore station of the Cleveland (Ohio) Electric Illuminating Company a new furnace design has been worked out. Its essential features are shown in the accompanying cross-section. Chain grate stokers are used, and instead of being placed in the usual way under the front of the boiler they are installed in the rear under the mud drum. An igniting arch extends under the mud drum, which sits rather high, its center being 15 ft. 8 in. above the floor line. The boiler baffling is of the type known as "Four-pass baffling." With this arrangement the gases in passing through the boiler enter the first bank of tubes at the top instead of the bottom. This puts the uptake also at the rear of the boiler and permits the gases that have passed through the two banks of economizers to be taken off in a single centrally located flue.



STOKER SET UNDER MUD DRUM OF BOILER WITH FOUR-PASS BAFFLING

## Extra-Wear Trolley Wire in Dublin

LIKE many American electric railways, the Dublin United Tramways realize that the advantages of extra-wear trolley wire for the maintenance of service on busy streets offset the disadvantages of lower conductivity. Such disadvantages, of course, are relatively small when there is in parallel plenty of feeder copper which never wears out.

At this time the company has in use approximately 62 miles of Phono-Electric trolley wire, comprising 10 miles of No. 0, 50 miles of No. 00 and 2 miles of No. 000. This is more than one-half of the total mileage of 110 miles. In addition, the company has recently erected 10 miles of No. 00 phosphor-bronze wire to replace No. 0 Phono-Electric wire that had been in service ten years on a line with heavy traffic. This is the first Dublin installation phosphor bronze working under severe traffic conditions, so that it is not possible to forecast the results.

R. Tanham, electrical engineer Dublin United Tramways, advises further that in general "Phono" has been found to wear twice as long as hard-drawn copper of the same gage. In the matter of breakage, No. 0 and No. 00 have been found superior to copper. The No. 000 size, however, which is installed on Sackville Street, the main traffic artery, does not appear to possess the same freedom from breaks, which occur nearly always at frogs and crossings. This may be due either to some defects in the manufacture of this particular wire or to the unusually severe traffic conditions.

# LETTERS TO THE EDITORS

## Accurate Track Cost-Accounting Data Are Sorely Needed

BROOKLYN, N. Y., May 14, 1919.

To the Editors:

There never was a time in the history of the electric railway industry when the subject of costs was so important as it is to-day. But although all departments are affected, the tendency seems to be to think and talk only of the cost of platform time, as it naturally bulks large in the payrolls. The transportation department can usually tell at a moment's notice just what the cost for car crews was for yesterday's mileage, and very likely the mechanical people can tell the cost to a nickel for car repair labor on the ten cars put through the shop yesterday. But how many way men can tell the cost for maintaining any particular piece of track? The correct answer to this inquiry is probably "very few indeed," yet if it is important to know just what platform time and car repairs are costing, it is just as important to know what the maintenance cost is for track. True, we can probably find the cost from the comptroller's accounts for the heterogeneous lot of tracks entire with which most roads are blessed, but it is next to impossible to get any information in detail as to where the money was spent and, what is more important, why.

When the maintenance of way engineer asks for accounting in sufficient detail to secure this information he generally is told that it either can't be done or that it would cost too much. So he must continue to make a guess as to where the money goes. On the other hand, no modern manufacturing plant could be run a week, successfully, if its management failed thoroughly to analyze the cost details in every department, and such plants spend money gladly for the purpose of keeping accurate costs.

Records of construction and reconstruction costs for tracks on electric railways are fairly plentiful, and if they were not, it is a comparatively simple problem to estimate them. On the other hand, track maintenance cost records which have any value even on one system are almost as scarce as hens' teeth. Only once have we seen any such thing which we felt could be called dependable.

In view of the fundamental desirability of knowing the truth about costs, it would seem a most appropriate time for the Accountants' Association and the Engineering Association jointly to revive the subject of maintenance cost accounting with particular reference to the matter of track maintenance costs, because money spent in accurately determining the cost of maintaining the several types of track on any one system will more than repay the expenditure if it assists, as it surely will, in settling the question of what type of track is the cheapest to maintain on that property.

WAY ENGINEER.

## Welding Special-Alloy Steel Rails

METAL & THERMIT CORPORATION

NEW YORK CITY, May 14, 1919.

To the Editor:

I was very much interested in your editorial entitled "The Relation of Rail Steel to Rail Joints on Electric Railways," published in the issue of May 10, but cannot but feel that the conclusions which you draw are just the opposite of what they should be if we are to look at the matter solely from the point of view of the best interests of the street railway companies. Instead of investigating the "relation of chemical analysis and details of manufacture of rails to the suitability of steel for adaptation of the several forms of joint welding now current," the object should be to adjust the welding processes so that successful welds can be made on the best steel for street railway purposes. This naturally implies first a careful investigation into the wearing quality of different kinds of rail steel and I have no doubt that in the end it will mean the adoption of a special alloy rail steel.

When a rail steel has been determined which will give the longest life in street railway service, the next step is to find a welding process which will weld the rails together so effectively that the life of the weld will be the same as that of the rail itself; nothing less than that should be considered.

Special-alloy rails are already coming into quite general use but there is no question also that they are the ones which are giving the greatest trouble from the point of view of most of the rail welding concerns. This difficulty not only can be overcome, but in my opinion has already been overcome, by at least one process which successfully welded a great many joints on Mayari steel rails in 1915. These, as your readers perhaps know, are a special-alloy rail containing nickel and chromium; the elements in question being contained in the ore which is mined in Cuba. The rails are considerably harder than ordinary steel rails and a much longer life is claimed for them. When it came to welding these rails, however, it was found absolutely impossible to do so by many well-known processes. One, however, was found to be entirely suitable, with the result that the joints welded four years ago as still in perfect condition.

With instances such as these in front of us, proving conclusively that special-alloy rails can be successfully welded, there certainly can be no occasion for reducing the quality of the steel or softening the rails simply to favor those welding processes which cannot successfully weld these alloy rails at the present time.

WILLIAM R. HULBERT,
Sales Manager Thermit Department.

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The United Railways of St. Louis, Mo., is using the backs of transfers for carrying a safety message. A series of special illustrated advertisements is used for this purpose.

# AMERICAN ASSOCIATION NEWS

## Oct. 6-10 the Big Week

THE thiry-sixth annual convention of the American Electric Railway Association will be held at Atlantic City, N. J., on Oct. 6 to 10, 1919, on Young's Million Dollar Pier.

A convention committee has been appointed as follows: L. S. Storrs, New Haven, Conn., chairman; C. L. Henry, Indianapolis, Ind.; J. J. Stanley, Cleveland, Ohio; T. W. Wilson, Wilmington, Del.; E. P. Waller, Schenectady, N. Y., C. R. Ellicott, New York, N. Y., and L. E. Gould, Chicago, Ill.

This will be the first convention held since 1916. The armistice has been signed, the country is returning to peace conditions and a large and enthusiastic attendance is assured. The program will be selected with special reference to the needs of the industry, and the subjects to be considered will be of interest and value.

An exhibit will be held in connection with the convention, and detailed announcements as to arrangements in this connection will be issued later. The exhibit committee intends to make this feature of the meeting of special importance and value. The necessity of improved and economical methods of operation is known to every railway man, and the committee has in mind a visual presentation of modern economies covering both devices and methods.

## Toledo Section Has 998 Railway Members

AT THE request of the editors of this paper D. H. Shapiro, assistant secretary Toledo Joint Section, has compiled a table showing the distribution of the membership of 1502 among departments and national associations. Excluding twenty-eight associate members who are not affiliated with particular societies, the active membership of 1474 divides thus: American Electric Railway Association, 998; National Electric Light Association, 426; National District Heating Association, 31; American Gas Association, 19.

The railway members are well distributed among the electric railway sub-departments and the heating and electrical departments as well. Mr. Shapiro attributes the large railway membership to the fact that a very considerable percentage of the employees are engaged in railway work. In addition it is possible that the small fee charged by the railway association has something to do with this.

## Bulletin on Labor Turnover

A bulletin just issued by the United States Training Service of the Department of Labor, C. T. Clayton, director, Washington, D. C., contains a number of suggestions regarding the reduction of the labor turnover in the industries. Much of the blame for the turnover is laid at the door of the employer, the principal factor being the failure to obtain from workers a full measure of efficiency. Six reasons assigned for reduction in efficiency are: (1) Power failure; (2) failures of equipment and repairs and like limitations; (3) lack of instructions; (4) lack of training; (5) failure to supply material, and (6) personal slacking.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## A Railway for One Dollar

### A Proposition That Ought to Satisfy the Most Truculent Advocate of Municipal Ownership

The fully equipped and operating electric railway at Merrill, Wis., has been offered to the city for the moderate consideration of $1 by the Wisconsin Valley Electric Company of Warsau. Except for a variation here and there, the property at Merrill has gone over the same route toward abandonment that the electric railways in many other small towns have traversed. The plan is to turn the road over to the city for operation with power supplied from the plant of the electric company. In the event that the city should decide to abandon service, the equipment would be turned back to the electric company for sale as junk.

#### HISTORY OF COMPANY

The franchise to operate in Merrill was granted on Dec. 9, 1889, for a period of thirty years. It was accepted on Dec. 30, 1899. The franchise accordingly expires on Dec. 30, this year. The enterprise has always been a financial failure. Nothing has been realized on the actual investment. Things were made worse for the company with the coming of the automobile. As an experiment 7-cent fares were put in with the approval of the local citizens and the Railroad Commission of Wisconsin. After four months' experience with the new fare the extra charge has not resulted in any increase in gross receipts. The loss for the current year is estimated at $5,000. Under these conditions the company will not ask for an extension of its franchise. Accordingly the company has written to the Mayor and Common Council to the effect that if it is desired by the city that the line should continue in operation it will be necessary for the city to operate the road after that date and thus absorb the deficit. The actual offer of the company as contained in the communication to the Mayor and Common Council is as follows:

> In view of the possible desire of the city to continue this operation and our desire to co-operate with the city in every reasonable way possible, we have, therefore, decided that we will offer this property to the city of Merrill for the consideration of $1. Such offer to be conditioned upon the city operating the line for at least a reasonable period and the property so offered to consist of all tracks, trolleys, cars, tools, etc., now used and useful in the operation of the line, but not to include any real estate or power-house equipment. We will, of course, furnish the necessary power for operation at reasonable rates, and in the event of acceptance on the part of the city, we are, of course, to be relieved of all future responsibility or expense of every kind or nature with reference to this property, exclusive of the obligation to furnish the necessary power as above stated.
>
> We are, therefore, bringing this matter to your attention at this time, so that it can receive your careful consideration in ample time for you to take such action as may seem best in the matter, before the expiration of our franchise on the date herein named. This property, of course, has a considerable value as a scrap proposition to this company, but before considering the sale of the property for this purpose at this time, we prefer to make an offer of a donation of the use of same to the city.

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## Commission Reorganization Program Completed

Governor Smith of New York has completed his legislative program for the reorganization of the Public Service Commission for the First District (Greater New York) by signing the second Foley bill which creates the office of Transit Construction Commissioner to administer subway and elevated construction work in the Greater City.

The first Foley bill, wiping out the five-headed commission which administered both construction and regulatory functions and substituting a single commissioner, with only regulatory duties, was signed recently and its approval was accompanied by the appointment of Lewis Nixon as commissioner.

The second bill was not accompanied by an announcement of who should fill the place and under the terms of the measure the Governor has twenty days to make the selection. The post pays a salary of $15,000 a year, and there is to be one deputy at $7,500.

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## Insist on Eight-Hour Day

Motormen and conductors of the Seattle (Wash.) Municipal Railway are taking steps to enforce the strict eight-hour day, with time and a half for all work in excess of eight hours.

The men have gone on record as unanimous in their demand for the strictly eight-hour day, and have taken action to enforce their demands by a strike if their claims are not allowed.

The trainmen also demand that as far as they are eligible the former employees of the railway division of the Puget Sound Traction, Light & Power Company, which the city purchased, be taken over by the city in a body, as they were given to understand would be the case. This latter demand will be taken care of by the city.

Thomas F. Murphine, superintendent of the municipal railway, is making an effort to work out new schedules to make all the runs come within the eight-hour day. He claims that the utilities department has no authority to pay the men time and a half for overtime. The men are now paid the regular rate for overtime, but the controversy is over the difference between straight time for extra work, and time and a half.

## Chicago At It Again

### Faint Hope That Enabling Legislation May Be Secured Looking Toward Traction Settlement

The first meeting of the local transportation committee of the City Council of Chicago, Ill., held on May 7, resulted in the speeding of plans for a settlement of the traction problem. This matter has been neglected since the tentative ordinance was defeated by the voters last November. Three bills for enabling laws have gone to the Legislature and two others are under way.

#### ALDERMAN PRESENTS PLAN

Negotiations with the companies are to be based on a plan suggested by Alderman U. S. Schwartz. His proposal contemplates a new municipal corporation which would have debt-creating power and the authority to issue securities for acquiring the railway properties. Through a board of control these securities would be offered for the existing bonds of the companies, and having additional security of the municipality behind them a lower rate of interest, perhaps 4½ per cent, would be possible. Thus the financing of the properties would result in reducing the fixed charges about $1,000,000 and the board would be less likely to require a raising of the rate of fare to pay the cost of service. It was suggested that the board should have a majority of members appointed by the City Council and the rest by the investors and the employees.

Walter Fisher, special counsel for the city, did not take kindly to the Schwartz plan, saying it probably would meet many obstacles in the Legislature and in the courts. He thought that previous decisions of the State Supreme Court indicated an unfriendly attitude toward such proposals, which would tend to increase the city's debt limit. However, the committee decided to seek enabling legislation so that time would be saved if an agreement can be reached with the companies on such a basis.

#### LEGISLATION SOUGHT

The three bills already filed at Springfield provide for authority to combine the surface and elevated roads; additional power for the city to build subways and for the city to lease and operate transportation lines. The Legislature will also be asked to create such a municipal corporation as the Schwartz plan contemplates and to give the city power to change rates of fare independent of the State Utilities Commission. Quick action will be necessary inasmuch as the Legislature is expected to adjourn about June 1.

# Cleveland Railway's Franchise Renewed

## Service-at-Cost Grant Extended for Ten Years—Changes That Were Made Are Explained

In renewing the franchise of the Cleveland (Ohio) Railway on April 7 the City Council extended its life for a period of ten years, from May 1, 1934, to May 1, 1944. As a matter of fact, the ten-year extension was the primary purpose of renewing the ordinance, since the franchise under which the company was operating provided that whenever the grant or any renewal thereof had less than fifteen years to run, the company would have a right to fix, charge and collect the maximum rate of fare mentioned in Section 22 of the franchise ordinance. This rate is 4 cents cash and seven tickets for a quarter, with a transfer charge of 1 cent and no rebate. In addition the city would lose control of the schedules and operation. In other words, had the franchise not been renewed before May 1, 1919, the company would have been able to operate under its own policies for the remainder of the franchise term of fifteen years. All rights retained by the city are enumerated in Section 9.

### Agitation for Significant Changes

While some of the members of the City Council desired to make important changes in the ordinance and Mayor Davis wished to take advantage of the opportunity to secure to the city certain features of control over the road that it does not now possess, the revision includes only such matters as were necessary to comply with ordinances that had been enacted independently from time to time by or as amendments to the original grant. A few portions, which applied only to agreements that have been finally satisfied or to companies which have gone out of existence, were omitted from the new draft.

Up to Section 8 the new ordinance is practically a duplicate of the old grant. This section, which related to the installation of pay-enter cars and the collection of fares has been replaced by the following:

> The company shall continue the most modern system of fare collection by fare boxes or otherwise.

### Modern Fare Collection Assured

This gives the company the right to install any modern system that may be considered better than the present or an improvement over the fare-box system now in use.

Section 10 was amended by omitting the following words at the beginning:

> Immediately upon the taking effect of this ordinance.

This provided for the appointments of a street railway commissioner at once, as it stood, and might have resulted in complications. The section otherwise relates to the commissioner and his duties. No other change whatever was made in it.

In Section 16, which relates to the capital value of the company, the figures, applicable when the old franchise was written, have been omitted. The items of which the capital value shall consist are now described as follows in the renewal ordinance:

> (a) The bonded indebtedness of the company as described in amended ordinance No. 16238-A, Section 16, and any renewals thereof and additions thereto, made pursuant to the provisions of said ordinance.
>
> (b) The floating indebtedness of the company represented by bills payable as of March 1, 1919.
>
> (c) The residue of the capital value of the company as fixed by amended ordinance No. 16328-A with such additions thereto as have from time to time been made pursuant to the provisions of said ordinance.

### Finding the Capital Value

The figures mentioned in this section of the old ordinance, it will be seen, are made the basis for finding the capital value of the company. They included the bonded debt at the time, the floating debt, the appraised value of both the properties of the Cleveland Railway and the Forest City Railway, unsecured debts of the two companies, guarantees of one kind and another and a number of other items. Aside from this the section remains as it was.

Section 17, relating to debts of the Municipal Traction Company, was omitted entirely, as they have been discharged. Section 18 in the old franchise becomes Section 17 in the new one, as a consequence of this omission. The numbering of the sections follow this in regular order to No. 36, which was repealed. There Section 37 in the old ordinance becomes Section 35 in the new one.

### Interest Fund Provisions Stand

No change was made in the section relating to the establishment and maintenance of the interest fund (Section 16, new ordinance) with the exception of increasing the figures for car-mile allowance from 11½ to 19½ cents, to accord with resolutions that have been passed by Council from time to time, as necessity arose. A few lines were revised to improve the diction.

The figures for the maintenance fund in Section 20 (Section 19, new ordinance) were also corrected to accord with resolutions since enacted. They were increased 1 cent per car-mile. It was also necessary to change the references in the different parts of the ordinance because of the slight change in the section numbers. This was done where any section after number 16 was mentioned.

### Rates of Fare Defined

Section 21 (Section 22, old ordinance) deals with the rates of fare and to this was added Section 21-A, which covers the war rates authorized on Aug. 3, 1918, which are to continue for six months after the conclusion of the war. As was noted at the time, the action of the City Council provided a sliding scale of rates, as follows:

> Six cents cash, nine tickets for 50 cents, 1 cent for transfer and no rebate.
>
> Five cents cash, five tickets for 25 cents, 1 cent for transfer and no rebate.
>
> Five cents cash fare, eleven tickets for 50 cents, 1 cent for transfer and no rebate.
>
> Five cents cash fare, six tickets for 25 cents, 1 cent for transfer and no rebate.
>
> Four cents cash, five tickets for 20 cents, 1 cent for transfer and no rebate.
>
> After this, the rates named in the original franchise apply.

### New Rates in Suburbs

New rates for the Euclid Avenue line east of East Cleveland are provided for in Section 21-B. Between Ivanhoe and Green Roads, the fare is fixed at 5 cents, but from any point on this line to any point in East Cleveland or in Cleveland, west of East Cleveland, the rate is to be 10 cents. Passengers are entitled to such transfer privileges as may be in force in East Cleveland and in Cleveland.

The first paragraph of Section 23 (Section 22, new franchise) was omitted. This portion described the manner in which the fare schedule should be put into effect and the steps that should be taken in case the interest fund was decreased by it. Since all this became history at the time, the matter was obsolete. The remainder of this particular section of the ordinance is retained as it was.

### Other Sections Omitted as Unnecessary

In Section 25 (Section 24, new franchise) the second paragraph providing for the extension of the Lorain Street line to the westerly city limits was also omitted, as that extension has been completed.

The last paragraph in Section 28 (Section 27, new franchise) was omitted, as it merely provided for the expenditure of a certain amount of money immediately after the old franchise took effect and this has, of course, long since been done.

In Section 30 (Section 29, new franchise) the last paragraph, relating to the extension of lines in Collinwood and Newburg City were stricken out, as the provision was no longer deemed necessary.

### Clarity by Condensation

Considerable superfluous matter was omitted from Section 35 (Section 34, new franchise). The sense of the section was not changed, but rather clarified by the omission. A slight revision was made in Section 43 (Section 41, new franchise) by the omission of the words between the word "expiration" and the word "or" in the third line from the last.

The company's letter of acceptance was changed in form to conform to the fact that there is only one company, while five existed at the time the original grant was formulated. It consisted merely of the omission of all the names except that of the Cleveland Railway.

With the aid of this brief explanation, it is believed that those who have copies of the franchise in its original form may be able to understand the conditions of the new grant without difficulty.

# Both Parties Rebuked in Milwaukee

## Legislative Investigating Committee Deprecates Company's Delay in Raising Wages and Commission's Dilatoriness in Deciding Rate Case

The special investigating committee of the Wisconsin Legislature, after inquiring into the matter of the strike of Milwaukee Electric Railway & Light Company trainmen on Jan. 1, 1919, has just reported its findings that the cessation of service was the result, on the one hand, of the company's failure to meet the just wage demands of the trainmen and, on the other hand, of the failure of the Wisconsin Railroad Commission to function expeditiously.

### NO CONSPIRACY

There was no finding of conspiracy between the company and its men, but the committee remarked that in no case should the commission be coerced into a decision by a party litigant. As to the company's ability to pay higher wages without a fare increase, the committee repeated the admission of the chairman of the commission that the company in 1918 was not earning much over 4 per cent on its invested capital, thereby sustaining the report of Hagenah & Erickson made at the request of the railway employees.

The case before the investigating committee arose as a result of the desire of the Milwaukee company and its Employees Mutual Benefit Association to have higher fares and therefore higher wages. In regard to this association, in which the employees have a gradually increasing influence, the committee report says:

> The company's policy in encouraging this association has largely contributed to bringing about among employees a commendable and general spirit of loyalty to the company and to the service. In and through the association the company management and the employees have come to stand upon a footing of mutual regard, forbearance, respect and confidence, a condition which cannot be too highly commended.
>
> During the war period, while the cost of living was constantly rising, the demands for more wages became insistent. In April, 1918, a contract between the company and the association members was made as follows: The company agreed to employ permanently only persons who would become members of the association, and the association agreed to provide the company with a sufficient number of employees. The company agreed to continue its contributions toward the activities of the association, as in the past, and to contribute the services of a medical director to the association.

### COLLECTIVE BARGAINING

> The company agreed to treat collectively with the members of the association on matters of wages, to make effective an eight-hour day, to increase wages (when the commission should provide funds therefor) on the basis of increased cost of living since the year 1914 and to adjust wages thereafter each half year, according to the cost of living, and to continue in operation the bonus pension system. It was mutually agreed that the members of the association of each department might elect representatives to a labor adjustment committee for the purpose of adjusting wages and conditions of labor, that the contract might be terminated by either party on six months' notice, that the company should not discharge an employee except for cause and that disputes between the association members and the company should be arbitrated.

After this contract was signed a committee of employees visited the Wisconsin Railroad Commission and endeavored to secure a decision on the November, 1915, petition of the company for increased revenues. Upon the representation of the committee after its return that a decision would be handed down not later than May 19, the company raised wages 10 cents an hour, effective May 1. On June 1 the commission increased the fares but, according to the company's contention, not sufficiently to allow a reasonable rate of return.

The men were only partially satisfied with their wages, and by August they were again agitating for a further increase. The company again applied to the commission for an increase in revenues, it being admitted by all parties in interest that the demands of the men were reasonable. Hagenah & Erickson made an audit for the employees and reported on Oct. 26 that the 1918 revenues amounted to only 3.84 per cent on invested capital and that the men's demands, if granted, would reduce this to less than 1 per cent. A period of inaction followed, although this finding was admitted to be in general accord with the commission's rulings, and the employees ceased work on Jan. 1.

### COMPANY SHOULD HAVE RAISED WAGES

In regard to this general situation the legislative investigating committee now says that it was the unquestionable legal and moral duty of the company to maintain service on Jan. 1, even though it was necessary to comply with the demands for increased wages. Had the company done so and had such action resulted in a total or partial loss of the fair return to which the company is entitled by law, it would have become the plain duty of the commission to make such order with respect to rates as would enable the company to earn a fair return in the future and to recoup its loss. In the public policy so declared in the railroad commission law, it is said, is found ample protection to the company against ultimate loss in paying any reasonable standard of wages.

### TEMPORARY INCREASE POSSIBLE

The investigating committee finds that the company was able to increase temporarily the wages of the men according to their reasonable demands and continue the service, the conclusive evidence of that fact being that it did advance the wages and continue its service after Jan. 1. The committee adds, however, that it is fair to say that the company never at any time conditioned its continuance of the increased wage upon a favorable decision from the commission. The company demanded only that a decision be rendered so that, if unfavorable, it might appeal to the courts for a review.

In regard to the general question of commission relationship to wage demands, the investigating committee says:

> There is a sharp difference of opinion between the company and the Wisconsin Railroad Commission as to the power and duties of the commission with reference to wages. The company contends that the commission has the power and duty to pass on the question of wages as a factor in the administration of the railroad commission law, and that where the increased wage is determined upon by the commission it is its duty, as a condition precedent to the payment thereof, to furnish revenues lawfully required for that purpose. The commission contends that it has no power and no duties in regard to wages, except to consider them when paid as an operating expense.
>
> It is the opinion of this investigating committee that the commission takes too narrow a construction of the law and that it has the power to consider wages the same as it has the power to consider any other factor in ordering service, and if this power is not sufficiently specific in the statutes as now provided the commission should be given that power. In other words, the commission should have full and comprehensive administrative jurisdiction to keep the wheels going and prevent cessation of service.

### COMMISSION DELAY CRITICIZED

In concluding its report the special committee remarks that although on April 4 the commission denied a fare increase no further cessation of railway service is assumed. The main difficulty in the situation, however, is still existent, for there appears to be a general lack of confidence in the ability of the Wisconsin Railroad Commission to administer the law. On this point the report says:

> There appears to be a general lack of confidence between officials of the city of Milwaukee and the members of the street car company in the ability of the Wisconsin Railroad Commission to administer the law. The city officials and the railway managers are equally suspicious of each other. The employees of the street car company and the public utilities are equally distrustful of the commission. The attitude of the company has been such as to make its employees hostile to the commission. The character of its advertisements have been such as to bring the administration of the law through the commission into public contempt. Likewise, the company may have brought upon itself the contempt of the commission. As there is no change of venue from the commission, this presents a serious question.
>
> The beginning of the trouble probably came from lack of prompt decision on the part of the commission. That condition has existed for a long time. Decisions have been delayed seemingly for unreasonable periods. There can be little justification in a hearing pending from November, 1915, to June, 1918. But other decisions have been delayed much longer.

### COMMISSION SHOULD KNOW

> The commission has the power and jurisdiction to require books to be kept by the companies in the manner and form required by it, and to require reports from the companies in the manner and form and at the time demanded by it. By a careful checking of these reports, as filed, and prompt correction of errors, there would seem to be no reason why the commission should not be fully advised of the financial conditions of the companies at all times. Such a system would in itself furnish a valuable check on the management and the service of such companies.
>
> By a full accounting system, the commission should have no serious difficulty in determining the general level of returns on invested capital from month to month and in maintaining that level by adjustment of rates and service. Hasty and ill-considered action should never be required, but reasonably prompt decisions are necessary to any system for administering justice.
>
> It would be well to guard against unwarranted delay in the future by providing in the law that whenever any party deems its case to be unwarantably delayed, it may obtain in the circuit court an order to show cause why the commission should not be ordered to render a decision within a reasonable time to be fixed by the court.

## Detroit Company Ready

### Outlines General Conditions Under Which Needed Railway Improvement Can Be Secured by the City

A meeting of the members of the Street Railway Commission of Detroit, Mayor Couzens and the officials of the Detroit United Railway was held on May 9. The main points brought out were that the company was willing to build the needed extension on Twelfth Street and St. Jean Avenue, and a hint that increased fares would be demanded soon.

### FARE DISCUSSION INCLUSIVE

The Twelfth Street plan provides for extending service of Trumbull cars 1 mile farther north on Twelfth Street. The St. Jean line will run from Jefferson Avenue north to connect with Kercheval, Mack, Gratiot, Grand Belt and Harper lines. The Epworth Boulevard extension was reported as two-thirds completed and construction progressing on the remainder. This line runs north from Warren Avenue to Grand River Avenue at Highfield and Joy Road.

The discussion of increased fares was not pursued to any definite conclusion as the meeting was called to discuss extensions and rerouting of present lines, not to consider fares.

The City Council instructed the corporation counsel to draft the agreement relative to the proposed extensions. The terms under which the new lines will be built provide that the city may take over the tracks at cost less depreciation whenever municipal operation is decided upon.

Councilman Nagel suggested the possibility of the city building and financing extensions and leasing them to the company, but Frank W. Brooks, general manager of the railway, expressed confidence that the two extensions could be financed with the company's present resources. He stated that $13,000,000 would ultimately be required to provide all extensions and improvements to service needed in Detroit and that the company could not provide for the improvements without an increase in fares.

### SOME IDEAS ON FARES

Owing to the extension of the city limits, Mr. Brooks stated, double fares were necessarily charged in some sections of the city. This practice would be discontinued by the company if the city granted the universal 5-cent fare basis with universal transfers and workingmen's tickets to be sold at eight for 25 cents. It might be necessary, however, to charge for transfers. According to Mr. Brooks the lines are losing money at the present rates, but he declined to answer a question from Mayor Couzens as to how long the railway could operate under present conditions without going into receivership.

It was brought out by the company that the major part of the required expenditure was needed for the purchase of new equipment. The day-to-day agreement between the company and city was referred to by Mr. Brooks as "clouded." He also pointed out that additional capital could not be secured under such an arrangement.

No comment was made by the members of the Council on the proposal by Mr. Brooks for abrogating the franchises on the 3-cent lines. Mr. Brooks gave it as his opinion that these franchises could be abrogated by agreement. A five-year agreement was suggested as a guarantee of good faith.

The officials of the company were instructed to outline plans for better service in congested sections by rerouting certain cars, and to submit plans at the next meeting on May 23. Council members were opposed to breaking up east and west runs and were inclined to order present routing changed, but this action was forestalled by the company. In discussing this matter it was stated by Mr. Brooks that Woodward cars carry more passengers than the Broadway tubes in New York and hence through cars crossing Woodward Avenue would add to the congestion.

The officials of the company agreed to the extension from the Eight Mile Road to the Six Mile Road, or the Palmer Boulevard line under the same agreement as the others.

### TURNBACKS CONSIDERED

The question of turning back interurban cars at the city limits was not agreed to by the officials of the railway and the matter was postponed for consideration at the next meeting when the company will be asked for proposed plans looking toward the relief of congestion caused by the interurbans.

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## Publicity Campaign Precedes Referendum

The business men and industrial leaders of Akron, Ohio, organized into the Citizens' Progressive Association of Akron, conducted during the week ended May 17 an extensive publicity campaign in favor of the Morse-Witwer ordinance, which will go before the voters on May 20, at a referendum election. The ordinance was passed by the City Council in March. It provides for a 6-cent fare, nine tickets for 50 cents on the city lines of the Northern Ohio Traction & Light Company and for a complete survey of the city's transportation problem to determine upon a comprehensive practical plan of transit development to keep pace with the growth of the city.

The referendum was asked by petition of opponents of the ordinance organized as the Car-Riders' League, and headed by ex-Mayor W. J. Laub. The railway is taking no part in the campaign. The Citizens' Progressive Association, which includes the city's leading men representing every industry and walk of life, has taken up the ordinance as a necessary part of the plans for civic improvements, industrial developments and adequate housing. Lee, Harris & Lee are directing the publicity campaign.

## Pittsburgh Troubles Multiply

### Employees Strike to Enforce Wage Demands While Creditors Clamor and Bond Interest Is Unpaid

The 3000 platform employees of the Pittsburgh (Pa.) Railways struck at midnight on May 14, leaving most of Allegheny County and part of Washington County dependent on jitney buses and the steam railroads for transportation. Up until midnight on May 15 neither the officials of the union nor the receivers of the company had made any move toward a settlement.

The cause of the tie-up was a dispute over the new wage schedule. The men demanded an increase of 12 cents an hour over the prevailing scale of 43, 46 and 48 cents an hour according to length of service. They had been receiving these rates under a contract which expired on May 1.

### ARBITRATION CAUSE OF TROUBLE

The actual point of difference upon which the strike was called, however, was the method of arbitration to be used in the settlement. The men demanded a final binding arbitration before the War Labor Board. The receivers, who are in charge under the United States District Court, contended that as receipts of the company are not sufficient to meet the current requirements, let alone the increased demands that the proposed new schedule would entail, they could not enter into binding arbitration without the express consent of the court.

The union gave the receivers until midnight on May 14 to obtain this consent. The judges refused to authorize arbitration except on condition that the results of the arbitration should be subject to court review. The strike followed.

The wage increases the men demand would cause a direct additional labor cost of $1,000,000 annually, and if the pay of other employees were to be equalized the additional expense would be raised to $2,000,000.

In declining to grant the receivers authority to enter arbitration before the War Labor Board, the results of which should be binding upon the court, the judges took the stand that such permission would amount to delegation by a court of part of its particular functions to another body.

Permission to arbitrate was granted, with reservation on the part of the court of the duty of passing upon the findings of the board. As to the demand of the men that the receivers be permitted to agree in advance to accept the findings, the court held that to do this would bind not only the receivers, but the court itself, and "that it is beyond our power to part with any of the authority vested in us by the Constitution of the United States and the Acts of Congress."

Immediately after the court handed down its decision on May 13 the court issued an invitation to the union officials to meet with it and prepare an appeal to the War Labor Board, in accordance with the terms of the judicial permission—that is, that resultant findings should be passed upon by the court. On this suggestion the attitude of the men was that they would be required to submit their claims to a double arbitration, once before the board and then again before the court. A deadlock ensued and the men refused to meet the receivers.

The vote authorizing the union officials to call the men out was taken on May 9. The count was 2,637 to 21. Armed with this authority, the labor leaders on May 10 forced the receivers to agree to ask the court for permission to enter binding arbitration proceedings. The receivers presented their petition in court on May 12. The judges handed down their refusal in less than twenty-four hours, for the ultimatum of the union officials to the receivers on May 10 stated that the men would be called out at midnight on May 14 unless binding arbitration was agreed to by that time.

### REVENUES INSUFFICIENT

At the time the receivers petitioned the court for the requisite permission one of them, S. L. Tone, presented a separate statement reviewing the financial history of the company for the past three years. He said that the difficulties the company was now experiencing arose from granting wage increases without making provision to meet the added expense incurred. He submitted that the revenues of the company were not sufficient to meet operating and maintenance demands; that bond interest had been defaulted and that even indebtedness incurred in the purchase of supplies and equipment had not been paid. He argued that creditors of the company for material delivered had just as valid a claim as the men, particularly in view of the fact that the men, through refusal to accept certain working conditions, had forced labor cost higher than reasonable complaisance on their part would have made necessary.

## Conductorettes Properly Protected

The Lockwood bill extending the protection of the labor law to women and minors employed in connection with the operation of electric railways was signed by Governor Smith of New York on May 13. The new law, which takes effect immediately, prohibits the employment of females under twenty-one years of age on electric railways and provides that no female employees shall work before 6 o'clock in the morning or after 10 o'clock at night, nor more than nine hours a day for six days a week, and must be allowed one hour for meals. The Governor said:

> It has been urged to me that the signing of this bill might mean the loss of positions to some women. I cannot bring my mind to the position where I can be moved by that argument. I regard it as a matter of State duty to protect the health and provide for the welfare of women and minors who must work.

## New British Labor Agreement

A general agreement between the tramway systems of Great Britain, represented by the Municipal Tramways Conference and the Tramways & Light Railways' Association, and the employees as represented by the National Transport Workers' Federation, was reached on March 20, 1919, subject to the grant by the authorities of an increase in fares before June 30. Without this grant, the agreement is terminable at one month's notice on either side. The agreement will mean for the London County Council tramways an additional annual expense for labor of £360,000. This is on a basis, for 1919-1920, of a wages bill of £2,421,250 and car mileage of 53,000,000, the figures for 1918-1919 being 48,052,801 car-miles and a wages bill of £1,888,600. An abstract of the agreement follows:

> The working week will consist of forty-eight hours, inclusive of signing on and signing off. Where railways in the past have had a week of fifty-four hours or less, the employees will receive fifty-four hours wages for forty-eight hours work. Where the companies have had a week of more than fifty-four hours, the employees are to receive for the reduced working week, wages equal to those received for the number of hours at present worked up to a maximum of fifty-seven hours. The employee must present himself, however, at the appointed time on each of his six working days, and the employers are at liberty to utilize his services in any way considered desirable if no work can be found on the cars, provided such work does not impinge on another man's job and is only of a temporary character. Overtime is to be paid for as mentioned below, and the men are to be guaranteed at least seven hours' work a day.
>
> For work on Christmas in England and on New Year's Day in Scotland, double time is paid. On the four other general holidays of the year, time and a half is paid. On Sunday time and a quarter is paid. Overtime is carefully specified, but, in general, the rate is time and a quarter for the first two hours and time and a half for any additional work. If an employee works voluntarily on his seventh or "rest" day, he receives time and a quarter on the rate of pay prevailing that day. All employees have a six-day holiday with pay annually after twelve months continuous service, with an additional two days during 1920.

## A Scramble for Improvements

The City Council of Seattle, Wash., and the utilities department have received urgent petitions from property owners on East Marginal Way providing for the construction of an electric railway to serve that district. The Industrial Association of the South End is backing the movement, insisting that the railway is essential not only to the industrial development of Seattle and the full usefulness of the investment approximating $3,000,000 in the Duwamish Waterway, but also that the line would pay by carrying the many employees of plants located along it, and the people of the South Park district.

The plan advocated is to build a connection with the elevated at Spokane Street down East Marginal Way, a distance of approximately 2 miles to a connection with the South Park car line at Eighth Avenue South, diverting the South Park traffic over East Marginal Way and relieving the crowded Georgetown line. The construction of the East Marginal Way railway was approved by the City Council last August in an ordinance providing for extensions, and a hearing on the petition for immediate construction will be held before the city utilities committee in the near future. It is pointed out that the cost of the line would not exceed $$75,000, with operating expense about $250 a day and income about $500 a day.

## Chicago Men Apprehensive

The award of the War Labor Board to the employees of the Chicago (Ill.) Surface Lines, made as of Aug. 1, 1918, was for the period of the war. With the fare situation as it is in Chicago, the employees are becoming apprehensive lest occasion arise for going back to the old wage scale. The situation is reflected as follows in the *Union Leader*, the official journal for Chicago of the organized surface and elevated railway employees:

> If Chicago street car men are to be forced to return to a wage ranging from 30 cents to 39 cents an hour, which would mean a wage loss of 23 per cent to 43⅓ per cent, or any reduction from the present wage, it should be plain to everyone what will happen in this city. With war costs still prevailing, and going higher, these men cannot exist on a less wage than now paid. In fact, they are finding it difficult to support their families on the present wage, which is not sufficient to provide the necessaries of life and the comforts to which their wives and little ones are entitled. Reducing the wages of the Chicago street railway employees would mean a challenge to every worker in this city to protect his wage rights.

## Wage Increase in Salt Lake

A decision awarding the employees of the Utah Light & Traction Company, Salt Lake City, a total increase in wages of $73,000 a year was reached recently by the board of arbitrators which has been considering the wage dispute between the company and its employees.

The award gives the carmen $60,000 a year increase, the shop and carhouse men $7,000, and the track men $6,000. Conductors, motormen and brakemen of the company, under the terms of the award, will receive 39 cents an hour for the first nine months' work, instead of 34 cents an hour for the first twelve months; 43 cents an hour for the second year, instead of 39 cents, and 47 cents an hour thereafter, instead of 42 cents.

An increase of 4 and 5 cents an hour is made in the rate of the shop and carhouse men, and an additional 30 cents a day to the track men.

The most important part of the award pertaining to hours and pay for overtime work provides that all regular runs of regular men shall not exceed nine hours where practical, and that time and a half shall be paid for work by regular crews who have completed a regular day's work and are then called out for extra work. A joint committee is provided for in the award to consist of representatives of the employees and of the company to work together in adjusting runs.

The new wage scale and other provisions of the award became effective on May 1.

## Arbitration in Scranton Under Way

With Charlton Ogburn, examiner in harge of the electric railway department of the National War Labor Board, itting as the fifth man and umpire, the rbitration of the dispute between the Scranton (Pa.) Railway and its em- loyees was begun on April 29. The com- any's arbitrators are W. L. Connell nd Attorney H. C. Reynolds; the union s represented by former Sheriff P. F. alpin and former Deputy Sheriff John . O'Malley.

At the opening it was explained that he representatives of the company nd the men had agreed relative to most of the items contained in the de- mands and that the points at issue re- er only to the wage scale, reduction of ours for certain workers and time and ne-half for overtime. The principal emands follow:

Conductors and motormen, first three onths, 58 cents an hour; next nine onths, 59 cents; thereafter; 60 cents. ime and one-half is demanded for all ork done in excess of the regular sched- le runs.

Time and one-half for all crews on weeper cars and each crew to include ree men.

Eight-hour day for carhouse men, shop- en and power house men at the following hedule of wages:

Blacksmiths, 57 cents an hour; car in- pectors, 68 cents; armature winders, 70 nts; men now classed as monthly men, cents; blacksmiths, 71 cents; drill press en, 68 cents; pit men, 68 cents; car ashers, 57 cents; fire men, 62 cents; oil- s, 57 cents; pit helpers, 68 cents; paint- s, 68 cents; janitors and watchmen, 57 nts; controller men, 68 cents; pipe fit- rs and repair men, 68 cents and sprinkler en, 57 cents.

Eight-hour day for trackmen and track remen and the following wage scale: rackmen, 57 cents an hour; foremen, 64 nts an hour; teamsters, 57 cents.

## News Notes

**Something New in Taxes.**—The new venue bill in Louisville, Ky., designed supply funds for the city to offset e saloon revenue, which will be lost ter July 1, will include a provision at all street car advertising in the ty shall be taxed $300 a year.

**Wages Up in Alliance.**—Motormen d conductors of the Stark Electric ailway, Alliance, Ohio, were granted increase in wages on May 7. Men the city lines in Alliance will re- ive an advance of 3 cents and those the interurban line an advance of cents an hour.

**Peculiar Wreck on Ohio Road.**—On pril 30 several workmen were injured a head-on collision between a work r and a freight car on the Columbus, elaware & Marion Railway. A der- k on the work car fell across the olley wire and the short-circuit this ade set fire to the cars, which were stroyed before the apparatus sent by e Delaware fire department reached e scene.

**Promise of Five Cents More an Hour.**—A strike on the Toledo, Bowling Green & Southern Railway, Findlay, Ohio, was averted on May 8 through the promise of Charles F. Smith, general manager, that he would make a recommendation to the board of directors of the company that the men be granted an increase of 5 cents an hour in wages.

**Five-Cent Wage Increase.** — Conductors and motormen of the Cleveland, Alliance & Mahoning Valley Railroad, Ravenna, Ohio, have been granted an increase in wages of 5 cents an hour. The new pay schedule provides 40 cents an hour for the first year of service, 43 cents an hour the second year and 45 cents the third year.

**Railway Displays Skyscraper.**—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is displaying a new window decoration in the form of a miniature skyscraper 7 ft. high and brilliantly lighted from the inside with electric lights. The model is taken from the Union Central Building in Cincinnati, which is 495 ft. high, reaching thirty-eight stories above ground.

**Back Pay by May 24.**—The receivers of the Rhode Island Company, Providence, R. I., have informed the officers of the union that, in the event of no appeal from the order of the court to pay the back wages due the car men being taken within the statutory time allowed, payment of such wages will begin on May 24, and be completed as soon as possible. The executive board of the union met immediately after the adjournment of the conference and unanimously concurred in the action of the union officers in accepting the receivers' proposition.

**War Savings Society Started.**—The British Columbia Electric Railway War Savings Society has been started with a branch at the head office. Each Tuesday every employee signing up will be called upon and given a thrift stamp or stamps for the amount he hands over. He can buy more stamps than he signs up for. As his thrift card is filled up, he will be able to buy a War Savings stamp with it. The next step will probably be the formation of War Savings societies in New Westminster, North Vancouver and the various other units of the company.

**Wage Agreement on New York State Lines.**—The New York State Railways and representatives of the employees have signed an agreement for a year. The agreement covers Rochester, Syracuse and Utica and calls for the same pay as during the last year. Under this agreement men beginning work on the cars will draw 41 cents an hour for the first three months. They will then be jumped to 43 cents an hour for nine months, and all men who have worked a year or more will get 45 cents an hour. Time and a half will be paid for overtime. This agreement is in accordance with the finding of the War Labor Board which was handed down last year.

**Wage Disagreement in Sioux City.**—The employees of the Sioux City (Iowa) Service Company have rejected the offer of a wage increase of 2 cents an hour, made as a compromise offer to the union's demand for an increase of 15 cents over the prevailing scale of 30 cents and 35 cents an hour. In the company's communication to the men it was stated the 2-cent raise would be allowed, although the present condition of finances did not warrant it, but the company made plain that it would not grant the nine-hour day and the clause for time and a half for overtime asked by the men. The union voted to submit a proposition for arbitration to the service company.

**Improvements Planned in Quincy.**—In compliance with the wishes of the City Council, the Chamber of Commerce and patrons of the company generally, the officers of the Quincy (Ill.) Railway, which is included in the Illinois Traction System, have agreed to install twenty-five new cars, to run cars more frequently on nearly all of the lines and to improve the roadway. The company has been anxious to make these improvements, but has been prevented by the war situation. At the request of the railway, President Fawcett of the local Chamber of Commerce has appointed a committee of city officials and business men to go to St. Louis and inspect the type of cars proposed for the Quincy lines.

## Programs of Meetings

### Arkansas Utilities Association

The date of the convention of the Arkansas Utilities Association has been changed from May 20-23 to June 10-12 on account of the dates in May conflicting with the convention of the National Electric Light Association at Atlantic City.

### Hearing of Public Utilities Committee at Washington

The second public hearing of the public utilities committee of the United States Chamber of Commerce on means for relieving the electric railway situation will be held in Washington, D. C. on May 28-29.

The first hearing of the public utilities committee was held in St. Louis at the time of the meeting of the Chamber of Commerce in that city and was reported in last week's issue of this paper.

The purpose primarily is to secure testimony on the best form of street railway franchise, the future direction of prices, the mutual interest of the home-owner and retail merchant in good street railway service, possible future economies in operation, relief from special taxes and other extra burdens and service-at-cost franchise plans.

The hearings will be held in the rooms of the United States Chamber of Commerce in the Riggs Building, Washington

# Financial and Corporate

## $374,017 Deficit for Chicago Railways

### Decreased Earnings and Higher Expenses Cause Loss of Almost Twice Net of Fiscal Year 1917-18

Another aspect of the heavy loss in gross earnings of the Chicago (Ill.) Surface Lines during the year ended Jan. 31, 1919, is shown in the recent report of the Chicago Railways. This part of the unified surface system suffered a decline from a net income of $409,975 in the preceding fiscal year to a deficit of $374,017 in the latest fiscal year. The Chicago Surface Lines include the Chicago Railways and the companies known as the South Side Lines, namely, the Chicago City Railway, the Southern Street Railway and the Calumet & South Chicago Railway.

INCOME STATEMENT OF CHICAGO RAILWAYS FOR YEARS ENDED JAN. 31, 1918 AND 1919

| | 1919 | 1918 |
|---|---|---|
| 60 per cent of residue receipts of Chicago surface lines... | $5,386,896 | $7,207,762 |
| Joint account expenses and adjustments applicable to previous years....... | 198,831 | 368,205 |
| | $5,188,065 | $6,839,557 |
| Interest at 5 per cent on valuation............... | 4,501,960 | 4,418,135 |
| Income divisible with city of Chicago............... | $686,105 | $2,421,422 |
| City's share, 55 per cent... | 377,358 | 331,783 |
| Company's share, 45 per cent | $308,747 | $1,089,639 |
| 5 per cent interest allowance on capital valuation of property.............. | 4,501,961 | 4,418,136 |
| Interest on bank balances... | 31,146 | 66,992 |
| Interest on treasury securities | 78,778 | 79,592 |
| Total income............ | $4,920,632 | $5,654,359 |
| Deductions: | | |
| Interest accrued on— | | |
| First mortgage bonds... | $2,784,050 | $2,784,050 |
| Consolidated mortgage bonds............... | 1,772,947 | 1,777,884 |
| Purchase money bonds.. | 203,649 | 203,650 |
| Interest on loans......... | 19,475 | ......... |
| Sinking fund reserve accrued............... | 250,000 | 250,000 |
| Federal income tax on interest coupons........ | 42,000 | 60,000 |
| Corporate expenses and adjustments........... | 222,528 | 168,800 |
| Total deductions....... | $5,294,649 | $5,244,384 |
| Net income................. | *$374,017 | $409,975 |

* Deficit.

As shown in the ELECTRIC RAILWAY JOURNAL of April 5, 1919, the net income of the Chicago City Railway, which constitutes most of the other part of the unified system, fell from $1,501,384 in 1918 to $846,186 in 1919. These losses were the result of a loss of $404,535 in the gross earnings of the combined surface lines and an increase of $2,630,242 or 11.3 per cent in operating expenses, the expenses of conducting transportation alone advancing $1,675,139, or 15.5 per cent. Detailed figures for the combined lines, before the splitting of the residue receipts 40 per cent to the South Side Lines and 60 per cent to the Chicago Railways, were published in the issue of April 5.

The accompanying table gives the details for the Chicago Railways. This company's surplus carried forward from the year ended Jan. 31, 1918, after the deduction of $100,000 of interest on adjustment income bonds, was $411,143. This, with the loss for the latest year of operation, left a surplus balance of $37,126 on Jan. 31, 1919. This figure is secured without provision for interest on adjustment income bonds for the year ended on that date.

The chief items of the company's income are the 5 per cent interest return on the capital valuation as fixed by the ordinance, and its share (45 per cent) of the net receipts divisible with the city. The 5 per cent interest return provides for the interest on that portion of the bonded debt of the company which is equal in amount to and therefore covered by the purchase-price of the property. The company, however, has an outstanding bonded debt in excess of the capital valuation or purchase price. The result is that the only source (aside from miscellaneous income) from which can be paid the interest on these excess bonds is the company's proportion of the net divisible receipts.

During the six-months period beginning Aug. 1, 1918, when the wage award of the War Labor Board became effective, not even the 5 per cent interest on the capital valuation was earned. Thus for this period as a whole there were no divisible receipts. Consequently, since August the interest was hardly earned on the bonds covered by the purchase price, to say nothing of those not covered by the purchase price.

The capital account or purchase price of the property at the close of the year was as follows: Purchase price Jan. 31, 1918, $89,529,413; added during the year for capital additions to the property, $1,058,227; purchase price Jan. 31, 1919, $90,587,640. Only absolutely essential additions to the property were made during the year.

The condition of the renewals and depreciation reserve fund at the close of the year was as follows:

| | |
|---|---|
| Amount in reserve fund Jan. 31, 1918.... | $5,150,945 |
| Additions to fund during year......... | 1,948,305 |
| | $7,099,250 |
| Renewal expenditures during year..... | 1,378,544 |
| Reserve fund at Jan. 31, 1919........... | $5,720,706 |

This fund is an actual deposit in bank. It is the principal item of "cash and cash items" appearing in the balance sheet. No expenditures may be made from this fund except with the approval of the Board of Supervising Engineers as prescribed by the ordinance.

## D. & H. Lines Suffer

### Increased Burdens Bear Heavily Upon Electric Railway Subsidiaries of Company During 1918

Nothing in the adverse conditions of the last few years quite approximated the difficulties of 1918 for the electric railway subsidiaries of the Delaware & Hudson Railroad. The report of this company for the year ended Dec. 31, 1918, gives the following data in regard to the various controlled electric railway lines:

### ALBANY INCOME DOWN $23,000

The gross operating revenues of the United Traction Company, Albany, N. Y., amounted to $2,530,057, operating expenses to $2,211,417 and net operating income to $124,835. These figures show an increase in operating revenues, as compared with 1917, of $71,209; an increase in operating expenses of $94,528, and a decrease in net income from operations of $23,008. Compared with 1913, operating revenues decreased $16,566, operating expenses increased $545,767, and net operating income decreased $552,926. The year 1918 shows a net deficit, after payment of fixed charges, of $132,740, an increase over the deficit of 1917 of $78,634, or 145.33 per cent.

### HUDSON VALLEY DECREASE

The operating revenues of the Hudson Valley Railway, Glens Falls, N. Y., amounted to $803,344, the operating expenses to $695,153 and the net operating income to $62,127. Compared with 1917, operating revenues increased $100,969, operating expenses increased $174,052, and net operating income decreased $76,967.

To compare the calendar year 1918 with 1913, the later year showed an increase in operating revenues of $97,236; operating expenses, an increase of $220,266, and net operating income, a decrease of $132,925. The net deficit of 1918, after payment of fixed charges, was $118,364, an increase of $13,239, or 12.59 per cent.

The operating revenues of the Plattsburg (N. Y.) Traction Company were $33,907, operating expenses, $24,498, and net operating income $7,786. These data show a decrease of $4,972 in operating receipts, compared with 1917; a decrease of $3,919 in operating expenses, and a decrease of $1,235 in net operating income. The net income, after payment of fixed charges, was $1,695.

### STILL ANOTHER DECREASE

The Troy & New England Railway, Troy, N. Y., had gross operating revenues aggregating $33,037, operating expenses of $27,090 and net operating income of $4,585. Compared with 1917 there was an increase in these revenues of $3,213, an increase in operating expenses of $7,442 and a decrease in net operating income of $4,229. The net deficit, after fixed charges, was $5,729.

# Reorganization Filed

## Plan Presented to California Commission Under Which Oakland & Antioch Railway Will Be Readjusted

The reorganization committee for the Oakland & Antioch Railway has filed with the California Railroad Commission a petition for an order approving the plan the committee has provided for the readjustment of the finances of the companies involved—the Oakland & Antioch Railway, the Oakland, Antioch & Eastern Railway and the San Ramon Valley Railroad. The plan provides for the organization of the San Francisco, Oakland & Sacramento Valley Railway as the successor company, and the issuance of first mortgage bonds and common and preferred stock in accordance with the agreement.

The total authorized bond issue will be $3,000,000. Not to exceed $1,950,000 of the par value of these bonds will be used or set aside for the purpose of carrying out the reorganization plan. The balance of the bonds, $1,050,000 par value, will remain in the treasury and may be issued for the purpose of defraying cost of additions and betterments. Furthermore, the deed of trust securing these bonds will provide that the remaining bonds will be issued only if the net earnings for the twelve months preceding have been at least one and one-half times the annual interest on the bonds outstanding plus one and one-half times the annual interest on the bonds to be issued.

### COMMON AND PREFERRED STOCK

Six per cent preferred stock will be authorized to the amount of $1,500,000, par value. Not to exceed 13,300 shares of this stock will be issued for reorganization purposes; the balance, 1700 shares, will remain in the treasury to finance additions and betterments.

Common stock will be authorized to the amount of $4,000,000 par value, consisting of 40,000 shares of a par value of $100 each. The common stock is to be non-assessable.

Creditors having first and direct liens on the mortgaged property which are valid and enforceable at law, and are approved by the bondholders' committee, are to be paid in cash.

The Oakland & Antioch Railway bondholders, Oakland, Antioch & Eastern Railway bondholders and San Ramon Valley Railway bondholders are to surrender all bonds held by them, together with all unpaid coupons maturing on or after Jan. 1, 1915, and will receive therefor:

Twenty-year first mortgage 5½ per cent gold bonds of a par value equal to 20 per cent of the par value of the bonds now held by bondholders; 6 per cent preferred stock of a par value equal to 20 per cent of the par value of bonds now held by the bondholders, and common stock of a par value equal to 60 per cent of the par value of bonds now held by the bondholders.

Creditors whose claims are secured by bonds are to cancel their obligations, and receive for each bond new twenty-year first mortgage 5½ per cent gold bonds, preferred stock and common stock in proportions noted.

Holders of Oakland, Antioch & Eastern Railway 6 per cent four-year convertible gold notes come within the provisions of this subdivision. Each depositing noteholder will be treated as if each note was separately secured by its pro rata of all the bonds held by the Union Trust Company, San Francisco, as security for the entire "Four Year Convertible Gold Note" issue.

Creditors whose claims are valid and enforceable at law and are approved by the bondholders' committee are to cancel their claims and receive common stock remaining in the treasury after common stock has been distributed to bondholders and secured creditors.

The advantages claimed for the reorganization plan follow:

> The fixed annual charges are kept well within the net annual income of the road conservatively figured. Bondholders retain the full benefit of all the security they hold after providing only for such creditors as already hold a lien prior to their lien. Creditors are dealt with in the order of their equities and treated in accordance with their equities. Bondholders automatically, through stock ownership, secure the benefits of all increased earnings as they accrue. The company will be permitted in the future to maintain its road and equipment in a state consistent with the best possible service to the public. Provision is made for additions and betterments, with proper safeguards to the interest of bondholders and stockholders.

# Dallas Outlook Bad

## President Strickland Points Out Inadequacy of Income and Difficulty of Raising New Money

The Dallas (Tex.) Railway is in a bad way financially after eighteen months of operation under the service-at-cost franchises, according to J. F. Strickland, president of the company. During this time, Mr. Strickland says, the company has earned on its capital an average of 4.1 per cent a year, not one penny of which has gone for dividends but which has been used for improvements and betterments. The rate of return permitted under the franchises upon the agreed valuation is 7 per cent a year.

The Dallas Railway, according to Mr. Strickland, is financed by short-time notes amounting to practically the value of the property owned at the time the franchises were granted. These notes amount to $5,000,000 and fall due on April 1, 1922. With the present earning capacity, as disclosed during the eighteen months of operation, Mr. Strickland has little hope that he will be able to refinance the company when the notes fall due. The notes are held by a holding company and are not secured.

The only hope, Mr. Strickland believes, is that the holders of the notes of the Dallas Electric Light & Power Company, a subsidiary company of which Mr. Strickland is also president and which has shown earnings of 9 per cent during its term of operation under the service-at-cost franchise, will be sufficiently well pleased with the investment that they will be willing to take the notes of the traction company too.

### HIGHER FARES FAILED ELSEWHERE

In answer to a direct question, Mr. Strickland stated he is opposed to increased fares, and that if it comes to a point where fares must be raised to avoid bankruptcy, he is through with the Dallas Railway. Increased fares, in his opinion, have proved unpopular wherever they have been tried, and the experience of those companies that have resorted to this plan for increasing revenues is that the plan has failed dismally. The unpopularity of the increased fare, coupled with its inconvenience, has almost universally resulted in decreased earnings through decreased patronage. In these days of automobiles, electric railways are compelled to cater to the public, for otherwise the electric carriers will get little business.

### NEW MONEY HARD TO RAISE

Speaking of the possibility of the Dallas Railway raising funds for additional improvements, Mr. Strickland said the company had already been compelled to pledge its property for the loan of $1,000,000 for improvements required under the terms of its franchise. These improvements are now being made. This loan of $1,000,000 cost the company 10 per cent, as it was necessary to go to Scandinavian banking houses to get the money, for which 7 per cent had to be paid, and the bonds had to be discounted 3 per cent in this country, making the total cost 10 per cent. The whole Dallas property is pledged to pay this loan and the money borrowed to erect the Interurban Building, and it cannot be pledged for additional loans. Dallas will need extensions and improvements after the $1,000,000 now being spent is gone, but where the money is to come from is not known. The question, Mr. Strickland said, is one he will put frankly up to the public.

The gross income of the company has increased 33⅓ per cent during the last year since the jitneys were put out of operation, but during the same time the cost of operation has increased 46 per cent. While it is expected that the gross income will continue to increase for some time, it is regarded as highly improbable that the operating cost will be decreased to any material extent for many years, if at all.

One of the plans for relief that has been suggested is for the city to relieve the company of its paving obligations, which have been a heavy drain on the company's income.

# Financial News Notes

**Wants Line Reopened.**—A petition for a hearing over the reopening of the Lee-Huntington line of the Berkshire Street Railway has been filed with the Public Service Commission.

**Protest Against Abandonment of Ohio Road.**—On April 30 the Commissioners of Hamilton County filed with the Public Utilities Commission of Ohio a protest against the abandonment of the Cincinnati & Columbus Traction Company's line. The hearing has been set for May 28.

**Ohio Road Sold.**—The Fishel & Marks Company, Cleveland, Ohio, is reported to have purchased the property of the Columbus, Magnetic Springs & Northern Traction Company, Richwood, Ohio, for $88,133, two-thirds of the appraised value. The road has not been operated since Jan. 1.

**Interurban Merger Being Urged.**—A merger of the Elgin & Belvidere Electric Company and the Rockford & Interurban Railway in the interest of through service and faster time between Elgin and Rockford, Ill., is said to be under way. The merger is being urged especially since Camp Grant has been made a permanent institution, with prospects of a steady volume of both freight and passenger business.

**Representatives of Note Holders at Birmingham.**—A conference of several of the large note holders of the Birmingham Railway, Light & Power Company, Birmingham, Ala., which is now in the hands of a receiver, was held recently in Birmingham. George Hooper Taylor and E. H. Rollins, bankers, Chicago, and others attended the conference. They conferred with City Commissioner J. Ellis Brown and asked a number of questions in regard to the service and how the business of the company was progressing.

**Canadian Government Makes Payment.**—It is announced that the Canadian government has paid to the Quebec Railway, Light, Heat & Power Company, Quebec, Que., the balance of the money owed it in connection with the sale of the Saguenay Railway, making, with the amount paid at the time of the sale, a total of about $3,400,000. The railway will use this money to reimburse the bondholders of the Saguenay Railway, which will benefit the Quebec company by relieving it of its obligation in the form of interest on the Saguenay bonds.

**Committee Report Postponed.**—The special committee named by the Indianapolis (Ind.) Street Railway, operated under lease by the Indianapolis Traction & Terminal Company, to devise a plan for reducing the fixed charges and eliminating sinking funds will report to the stockholders on June 2. The committee planned to submit its report on May 8, but it was unable to do so, and an extension of time was granted. The appointment of the committee was regarded as the first step toward the financial readjustment of the local Indianapolis lines. The matter was referred to in the ELECTRIC RAILWAY JOURNAL of April 26, page 840.

**New Directors for Chicago Suburban Lines.**—At a special meeting of the board of directors of the Aurora, Elgin & Chicago Railroad, held in Chicago, Ill., on May 3, R. M. Stinson of R. M. Stinson & Company, Philadelphia; Lewis B. Williams of Hayden, Miller & Company, Cleveland, and A. B. Conant of A. B. Conant & Company, Boston, were elected to the board of directors. Messrs. Stinson, Williams and Conant, who are members of the protective committee recently formed to safeguard the interests of the company's first and refunding mortgage bonds and three-year collateral trust notes, accepted places on the board of directors for the better protection of the interests which they represent.

**Foreclosure Sale on May 24.**—All of the property of the Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va., which operated between Friendly and Sistersville, will be sold at public auction on May 24 at Parkersburg, by Judge M. H. Willis, New Martinsville, special commissioner. The object is to pay off the debts of the concern. The line has had a troublous career ever since its organization in 1903. After several years of operation by the interests that built it, the road passed into a federal receivership. Then the Tyler-Wetzel Traction Company leased the line and tried to operate it, but it proved unprofitable. No cars have been run on the line for several years. The road is advertised as being "valuable for its material or for consolidation with two adjacent lines of electric railway."

**$4,500,000 Michigan Railroad Bonds Offered.**—The Michigan Railroad, Kalamazoo, Mich., which owns and operates interurban railways in Michigan, has sold to the National City Company, New York, $4,500,000 of first mortgage five-year 6 per cent gold bonds. The bonds were offered on May 13 at 95 and interest to yield 7.21 per cent. The mortgage will provide for a sinking fund to retire semi-annually $50,000 of the issue. The company is required, under the mortgage, to expend annually or deposit in cash with the New York trustee in a general reserve fund not less than 20 per cent of its gross earnings for maintenance, repairs, replacements and renewals of the property. Net earnings are nearly 1.85 times the annual interest charges on the first mortgage bonds.

# Electric Railway Monthly Earnings

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $83,717 | *$57,862 | $25,855 | $20,217 | $5,638 |
| 1m., Mar., '18 | 76,107 | *47,448 | 28,659 | 19,621 | 9,038 |
| 12m., Mar., '19 | 949,857 | *617,288 | 332,569 | 241,040 | 91,529 |
| 12m., Mar., '18 | 892,825 | *527,164 | 365,661 | 231,360 | 134,301 |

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $3,994,180 | *$2,625,592 | $1,368,588 | $1,556,053 | ‡†$139,737 |
| 1m., Mar., '18 | 3,649,670 | *2,025,425 | 1,624,245 | 1,175,342 | ‡502,934 |
| 9m., Mar., '19 | 31,260,158 | *21,655,806 | 9,604,352 | 13,384,175 | ‡†3,337,064 |
| 9m., Mar., '18 | 30,144,018 | *16,896,992 | 13,247,026 | 9,998,674 | ‡3,656,733 |

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $267,284 | *$194,902 | $72,382 | $39,880 | $32,502 |
| 1m., Mar., '18 | 218,584 | *141,476 | 77,108 | 40,980 | 36,128 |
| 12m., Mar., '19 | 3,036,775 | *2,093,087 | 943,688 | 478,712 | 464,976 |
| 12m., Mar., '18 | 2,471,564 | *1,600,615 | 870,949 | 489,600 | 381,349 |

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Feb., '19 | $229,801 | *$149,028 | $80,773 | $27,966 | ‡$62,390 |
| 1m., Feb., '18 | 237,353 | *141,189 | 96,164 | 28,238 | ‡77,509 |
| 12m., Feb., '19 | 2,916,386 | *1,903,954 | 1,012,432 | 336,693 | ‡790,738 |
| 12m., Feb., '18 | 2,740,100 | *1,534,565 | 1,205,535 | 347,427 | ‡906,024 |

* Includes taxes. † Deficit. ‡ Includes non-operating income ** Revised report. § In December, 1918, $331,428; December, 1917, $150,706; twelve months, 1918, $539,189; twelve months, 1917, $180,706, included for depreciation.

PENSACOLA (FLA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Feb., '19 | $49,842 | *$39,487 | $10,355 | $9,115 | $1,240 |
| 1m., Feb., '18 | 35,228 | *23,829 | 11,399 | 7,996 | 3,403 |
| 12m., Feb., '19 | 534,016 | *390,561 | 143,455 | 102,220 | 41,235 |
| 12m., Feb., '18 | 368,874 | *222,194 | 146,680 | 94,020 | 52,660 |

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.**

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Dec., '18 | $741,742 | §*$716,469 | $25,273 | $188,894 | †$163,621 |
| 1m., Dec., '17 | 594,020 | §*479,885 | 114,135 | 179,036 | †64,901 |
| 12m., Dec., '18 | 7,667,129 | §*5,127,035 | 2,540,094 | 2,218,187 | 321,907 |
| 12m., Dec., '17 | 6,023,509 | §*3,576,593 | 2,446,916 | 2,152,051 | 294,865 |

SAVANNAH (GA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Feb., '19 | $96,399 | *$82,917 | $13,482 | $25,356 | †$11,874 |
| 1m., Feb., '18 | 85,198 | *56,906 | 28,292 | 24,382 | 3,910 |
| 12m., Feb., '19 | 1,214,833 | *908,972 | 305,861 | 305,291 | 570 |
| 12m., Feb., '18 | 1,002,397 | *672,128 | 330,269 | 292,499 | 37,770 |

TAMPA (FLA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Feb., '19 | $102,948 | *$58,728 | $44,220 | $5,338 | $38,882 |
| 1m., Feb., '18 | 87,102 | *47,303 | 39,799 | 5,261 | 34,538 |
| 12m., Feb., '19 | 1,096,591 | *639,299 | 457,292 | 61,722 | 395,570 |
| 12m., Feb., '18 | 992,187 | *569,706 | 422,481 | 57,836 | 364,645 |

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $914,419 | $672,932 | $241,487 | $162,156 | $79,331 |
| 1m., Mar., '18 | 835,293 | 614,391 | 220,902 | 160,696 | 60,206 |
| 3m., Mar., '19 | 2,618,503 | 1,976,393 | 642,110 | 471,501 | 170,609 |
| 3m., Mar., '18 | 2,457,390 | 1,881,090 | 576,300 | 466,130 | 110,170 |

# Traffic and Transportation

## Zones for San Diego

### Suggestion Is Made for Five-Cent Stand-By Charge and Commutation Rates

The preliminary hearing of the San Diego (Cal.) Electric Railway before the State Railroad Commission on its application for an investigation into the affairs of the company came to an end on April 30 with the presentation of the suggestions of the company regarding the schedule of fares which should be allowed in order to afford the company sufficient revenue for its maintenance and an examination of the present condition of the company's roadbed in different parts of the city. The final hearing, based upon the commission's examination of the data which has been prepared and presented by the company, will be held on June 17.

### A FIVE-CENT BASE

The suggestion of the company provides for the creation of a zone system by which the short and long hauls shall be differentiated, with a charge of 5 cents a ride for all journeys within the limits of the "inner" zone, and a fare of 10 cents for all rides of whatever length in the "outer" zone.

All fares for rides beginning and ending in the inner zone are to be 5 cents, including transfer privilege. The distance which may be traveled within this zone for 5 cents is approximately 3.3 miles.

The outer zone is to include all the territory from the edge of the inner zone to the limits of each car line, with the exception of the National City and Chula Vista line. The fare for all rides originating or ending in the outer zone, without regard to their length, will be 10 cents.

Patrons, however, may go for 10 cents through both zones into any part of the city with the same transfer privileges which are now extended. Thus, a patron may ride only ten blocks in the outer zone, and his fare will be 10 cents, or he may pass for the same fare from one end of the outer zone through the inner zone to the end of another portion of the outer zone.

### STAND-BY CHARGE EXPLAINED

The reason for the foregoing plan is that a car, in serving the outside districts, is giving a "stand-by," or "ready-to-serve" service which must be continually maintained, and which is brought about by the expense necessarily incurred in sending a car over the entire line in order to reach a patron in the outlying districts. Under any other system, it is pointed out, patrons could ride for 5 cents over long distances, subjecting the company to a heavy surcharge, due to the necessity for maintaining service through both the inner and outer zones, without an adequate return on the investment or maintenance charges.

Modifications of the 10-cent fare are suggested, however, which will effect a material saving over the straight cash payment. The first of these modifications is based upon the belief of the officials of the company that the patron who uses a car at least twice a day is to be considered, as it were, a wholesale patron, to whom transportation is being sold in quantities, and who is therefore entitled to a wholesale price. To such a person it is the plan of the company to sell a commutation book with two tickets good for each day of the calendar month, the price of the book to be $4. The tickets will be good only for the day for which they are stamped, but they will be transferable and they will carry the present transfer privileges.

A second rate for the patrons will be a 7½-cent ticket, which will be sold in blocks of four or more. This ticket must also be used in the month in which it is bought and is transferable to other parties. It also carries the usual transfer privilege.

## Wants Ten Cents in Cuyahoga Falls

At a special session of the Village Council of Cuyahoga Falls, Ohio, on April 30 a formal application for a new franchise of five years duration was presented by the Northern Ohio Traction & Light Company in a communication signed by A. C. Blinn, general manager, accompanied by a proposed franchise ordinance covering many points relative to operations, pavements, rights-of-way, etc., and containing the important fare question, as follows:

> A cash fare of 10 cents between Cuyahoga Falls and Akron.
>
> Five tickets for 30 cents good for transportation from any point in Cuyahoga Falls to a transfer point in Akron.
>
> One cent additional for transfers.

At the conference between the traction officials, the Councilmen and Mayor, and a citizens' committee, some time ago, the company was told that the village insisted on a 5-cent fare to a transfer point in Akron, and 1 cent additional for transfers.

The proposal of the company as submitted on April 30, apart from the 10-cent cash fare item, is 1 cent from being in agreement with the proposal of the village.

According to Mayor Taylor, who presided at the meeting, no franchise will be granted which calls for a fare of 10 cents, cash or otherwise, between Cuyahoga Falls and Akron.

The proposal of the company was referred to the Council as a whole.

## Increase Not Contemplated

### Motives of Philadelphia Rapid Transit Company in Advertising Fare Changes Misunderstood

No intention of asking the public of Philadelphia to subscribe to an increase in fare is intended by the Philadelphia (Pa.) Rapid Transit Company, according to statements made by officials. It is declared that the fare is to remain 5 cents a trip, plus the addition of 3 cents for a transfer, as it has been for years.

The statements were made in reply to numerous inquiries which have been made in regard to the placards which have been displayed in all cars for several weeks and which tabulate the fares of several leading cities, to wit: Boston, 8 cents; Pittsburgh, 7 cents; St. Louis, 6 cents; Philadelphia, 5 cents. The idea seems to have spread that this publication was leading up to a demand for a fare increase. An official of the company is quoted in the Philadelphia *Public Ledger as* follows:

> The whole idea of publishing this table and displaying it prominently in the trolley cars was to inform the traveling public exactly how cheap are the transportation facilities afforded them by our lines. There was no idea whatsoever of leading up to a demand for an increase in fares.
>
> The signs have been removed from the cars, and this removal, I understand, has given rise to suggestion that they were only used with the purpose of impressing upon the people of Philadelphia that they were the opening wedge of a propaganda for subsequent legislation leading to an increase in proportion to that now in effect in other large cities. But their removal had nothing to do with any such purpose, even if it was contemplated.
>
> We have substituted Willow Grove signs, because it is necessary to give the park and its free attractions all the advance publicity possible at this time of the year. It costs many thousands of dollars to provide these amusements, therefore it is readily apparent, or it should be, that we must avail ourselves of all possible means to advertise them properly.

## Rainier Valley Line Wants Six Cents

The Public Service Commission of Washington recently notified Corporation Counsel Walter F. Meier of Seattle, Wash., that a hearing would be held in that city on the application of the Seattle & Rainier Valley Railway to increase fares on its lines. The company's new tariff, filed with the commission, provides for an increase of regular fare to 6 cents with a charge of 1 cent for transfers to other lines and charge of 2 cents on all transfers from other lines.

The purchase of this company's lines is proposed by the city to complete the municipal railway system. Negotiations were opened by the city when the purchase of the railway lines of the Puget Sound Traction Light & Power Company was approved last December. In anticipation of the purchase of the Rainier Valley lines, the Legislature at the request of the city of Seattle, passed a law permitting cities to operate railways outside the corporate limits. This permits Seattle to operate the Renton interurban line, which is a part of the Rainier Valley system.

# Boston Elevated Service Improvements

## Many Changes Carried Out Recently in the Interests of the Public and As Economies to the Company

C. D. Emmons, general manager of the Boston (Mass.) Elevated Railway, recently issued a press statement summarizing improvements in service on the Boston property since Dec. 1, 1918, and outlining work now in progress to better transportation facilities in the metropolitan district.

### Seating Capacity Increased

There has been an increase in seating capacity on the entire system of 6 per cent. In the Washington Street tunnel a 50 per cent increase in service has been provided, and in the Cambridge subway four-car service is now furnished in the rush hours. The East Boston and Chelsea service of the company has been increased by the addition of two-car train service in rush hours, through the East Boston tunnel. At Park Street, Boston, the subway service has been improved by the substitution of many two-car trains in rush-hour periods for single cars, and in the maximum hour 271 cars are now supplied at this important traffic center.

Deliveries have begun on 250 center-entrance cars lately ordered at an outlay of more than $3,000,000. From seventeen to twenty cars a week are now being painted in the company's shops, and this rate will soon be increased to twenty-five a week. A one-man car has been placed in test service in West Roxbury. Between Jan. 7 and May 5 the Board of Health inspected 8426 cars for cleanliness. Of these, 6909 were given 100 per cent, and only thirty-three were marked below 70 per cent, the "passing" mark. Of 8475 cars inspected for ventilation, 6909 cars were graded at 100 per cent, and thirty-four were marked below 70 per cent. Regarding overcrowding, 8960 cars were inspected, 7705 being given 100 per cent and only fifty-three below 70 per cent. In every case where a car was checked below the passing mark, the number of the car was taken and the condition was immediately remedied.

### Budget System Established

An important forward step has been taken in the establishment of a budget system, under which the company plans to expend $21,500,000 for improvements during the next five years. This was detailed in the ELECTRIC RAILWAY JOURNAL, Feb. 22, 1919, page 367. Within a few weeks the Everett elevated extension has been opened, representing a cost of $3,000,000, and shortening the running time between Malden, Everett and Boston by about five minutes and eliminating the necessity for changing cars at the Sullivan Square station in Charlestown.

The company is restoring to their jobs all returning service men from the United States forces. So far about 600 men have been reinstated, out of 1743 men who served in the war. Other improvements in the service include track rearrangement and reconstruction, new track laying, etc., totaling about $1,000,000 appropriation; rearrangement of ticket booths and provision of increased platform attendance at certain points; destruction of 500 antiquated cars formerly stored at Forest Hills; introduction of metal tickets; provision for rush-hour sale of metal tickets from bags in charge of extra employees stationed at subway entrances; a campaign against expectoration, and a closer following up of the causes of collisions. A minor but appreciated convenience is the provision of broken stone platforms at reservation stops.

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## London Proposes to Shorten Zones

On April 15 the London County Council voted to increase the fares on its tramway lines. At present routes are divided into sections of an average length of 0.6 mile, any three of which can be traversed for 1d., six for 2d., nine for 3d. and any further distance for 4d. It is now proposed to have the sections of an average length of 0.75 mile, two sections to be traversed for 1d., four for 2d., six for 3d., and eight or more for 4d. This would reduce the length of ride for a penny from 1.8 to 1.5 miles. The lengthening of the sections and the reduction of their number, it is thought, will give the conductors more time to collect their fares. Workmen's tickets are sold at a lower rate. The Council hopes that these revised fares will increase the revenue by £416,000.

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## Toledo Fares in Court

Judges Warrington, Knappen and Denison of the United States Circuit Court at Cincinnati, Ohio, heard arguments on May 7 in the appeal of the city of Toledo from the injunction order issued by United States District Judge John M. Killits restraining the city from interfering with the collection of a 5-cent fare by the Toledo Railways & Light Company.

Mayor Cornell Schreiber, who is an attorney, contended that the city is prevented from enacting legislation to regulate the rate of fare while the injunction is in force. Should it attempt such legislation it might be held in contempt of court. He also contended that the Federal Court has no jurisdiction in the case and that Judge Killits exceeded his authority when he granted the order.

Director of Law Ralph Emery told the court that the injunction was standing in the way of an adjustment of the differences between the company and the city. He asked that the decree be reversed.

George D. Welles, representing the company, charged that Mayor Schreiber had always been hostile to the company and to prove his contention quoted from Mayor Schrieber's speeches both before and after his election as Mayor. He also asserted that the injunction does not prohibit the city from enacting rate legislation.

The long fight between the company and the city, extending back over years, is too familiar to most railway men to require comment. The company has been endeavoring in every way to secure a renewal of its franchises on terms that will allow it to operate on a fair margin of profit and give the service that the city should have. The court took the case under advisement.

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## Louisville-Detroit Freight Service

Handling of freight by electric railway between Louisville, Ky., and Detroit, Mich., is promised through arrangements by A. F. Vandegrift, acting traffic manager of the Louisville Board of Trade, for the completion of plans for an interurban freight station in Louisville by the Inter-State Public Service Company, which operates across the Ohio River into Indiana. The extended freight service is promised by Aug. 1.

New tariffs will be made covering movement of freight into Indiana and Ohio except stations on the Chicago, Lake Shore & South Bend Railroad, and to stations on such lines in Ohio as the Ohio Electric Railway, the Dayton & Troy, the Dayton, Covington & Piqua, the Western Ohio, Toledo & Indiana and the Toledo & Western.

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## Storage Battery Cars at Point Shirley

The Point Shirley Street Railway, operated by the Boston, Revere Beach & Lynn Railroad, has placed two storage-battery cars in service on its 1.2-mile line between Winthrop Beach and Point Shirley, superseding gasoline passenger trucks previously used. Recently patrons of the former company petitioned the Public Service Commission on behalf of improved service.

The line was originally served by a gasoline-electric car and later by a Federal storage-battery car. Last fall, after about four years service, the battery became worn out and the auto-bus service was inaugurated by the company. This was unsatisfactory and the patrons asked the commission to require the company to install an overhead trolley line. The commission refused to order this, on the ground that the cost of so doing, including power-plant facilities and the purchase or alteration of cars necessary would be about $45,000, an expenditure which the company was unprepared to make and which the traffic did not justify.

The company purchased two cars from the Third Avenue Railway, with electrical equipment, and has installed batteries supplied by the General Lead Battery Company, Newark, N. J. The new service, started on May 1, has been a great improvement over the auto-bus.

# Transportation News Notes

**Hearing on Transfer Charges.**—The Public Service Commission of the Second District of New York will hold a hearing at Syracuse on May 19, on the petition of the New York State Railways for authority to charge 1 cent for transfers in Syracuse.

**Protests Fare Increase.**—The Chamber of Commerce of Clarksburg, West Va., has announced it will file a protest with the Public Service Commission against the proposal of the Monongahela Valley Traction Company to increase fares from a 5-cent and 6-cent rate to a flat 7-cent rate.

**Six Cents in Bluefield.**—A decision was announced by the Public Service Commission of West Virginia on April 9 under which the Appalachian Power Company was authorized to increase fares on its railway line in Bluefield from 5 cents to 6 cents, but with twenty tickets for $1 and fifty school tickets for $1.50.

**Wants Interline Dispatch Rates.**—Application has been made to the Public Service Commission of Indiana by the Marion & Bluffton Traction Company, Bluffton, Ind., for the establishment of interline merchants' dispatch rates from points on its line to points on other electric railways in Indiana and for readjustment of the rates between any two points on the company's road.

**Alton Fares Stand.**—The Public Utilities Commission of Illinois has issued a final order denying the application of the Alton, Granite City & St. Louis Railway, Alton, Ill., for an increase in fare on the Alton city lines to 8 cents. The same order covers the Venice, Granite City and Madison local service where a similar increase was asked. Alton now has a 7-cent fare. Citizens protested against any further increase. The increase was also opposed by the Board of Trade of Alton.

**Hearing May 20 on St. Louis Fares.**—The Public Service Commission of Missouri has decided to hold a hearing on May 20 in St. Louis to consider the application of the United Railways for an extension of the 6-cent fare beyond June 1, on which date it automatically expires. The applications of the United Railways and of the Missouri Electric Railroad, a subsidiary road, for a continuance of the present rates of fare in St. Louis and St. Charles Counties will be heard at the same time.

**Asks Seven Cents in Davenport.**—The Tri-City Railway, Davenport, Iowa, is asking the City Council to call a special election at which a 7-cent fare will be voted on. The fare is now straight 5 cents. In addition to asking the increased fare the company is asking that the Fourth Street line be discontinued. This line parallels the two main lines through the business section and has lost money for years. It serves Suburban Island, a summer resort and park. The park line will be maintained according to the plan and traffic handled by transfer from the Third Street line.

**Appropriations for Fare of City Employees.**—An ordinance introduced in the City Council of Seattle, Wash., provides for the payment of fare of policemen and firemen who use the municipal railway from the general fund. The ordinance stipulates that the utilities department shall be paid monthly at the regular 5-cent fare for all policemen and firemen carried. The amount is to be determined by a check twice a year of the number of policemen and firemen riding. The ordinance carries an appropriation of $20,000 for the Police Department and $18,000 for the Fire Department.

**Six-Cent Appeal in Johnstown.**—A petition for an increase in fare from 5 cents to 6 cents will be filed by the Johnstown (Pa.) Traction Company, according to a statement given out by General Manager Scott S. Crane. The petition will include the provision that when the increase is granted, the present zone system will be done away with and a universal transfer system installed. This will tend to eliminate much of the inconvenience now caused workingmen, who have to pay a double fare from their homes to the shops. It will permit a person boarding a car at one end of the city to ride to the extreme other end by the payment of one 6-cent fare, instead of the 10 cents now necessary.

**New Transfers Unsatisfactory.**—After a brief tryout the new transfer system of the Kansas City (Mo.) Railways proved unsatisfactory. The public objected to it and the conductors rebelled against the burdens which it placed upon them. The company will continue the new slips, as it has a supply on hand, but will punch nothing but the time, as has been done with the old slips. The new system was in use only two days. At the end of the first day several conductors resigned. The second day many conductors refused to punch the slips as required. They merely passed the transfers out to the passengers. Under the system as now modified patrons are not required to announce their place of transfer, but may change cars wherever they wish.

**Must Answer Fare Complaint.**—The Public Service Commission of Pennsylvania on May 12 dismissed the demurrer of the Philadelphia Rapid Transit Company in the case of the Northwest Business Men's Association of Philadelphia against the company, and directed the company to file an answer within fifteen days. The original case involves the complaint of the business men's association against the alleged discriminatory rates of fare in Philadelphia, the complaint being based on the way the company gives out transfer tickets on certain lines and does not extend the same privilege on other lines. The company demurred on the ground that the commission has no jurisdiction in the matter because of the 1907 agreement between the city and the transit company.

**Skip Stops on Municipal Line.**—The skip-stop plan will be introduced on the Seattle (Wash.) Municipal Railway on the Phinney Avenue line, between North Eighty-fifth Street and Lake Washington Canal. A survey of the line has been made under the direction of T. F. Murphine, superintendent, and the system will go into effect as soon as the signs have been put up. The stops will be staggered. There are now 197 stops on the line from the terminus on North Eighty-Fifth to the downtown loop. It is proposed to eliminate fifty-eight stops. The average distance between stops now is 376 ft. Under the proposed system, the distance between stops will be 540 ft. The present time of thirty-eight minutes to make the run one way will be cut down so as to effect a saving of eight minutes on the round trip.

**Change in Freight and Commodity Rates.**—The Public Service Commission of Indiana has authorized interurban railways operating in Indiana to readjust their class freight rates and commodity rates so that the readjusted rates, zones, and classifications shall be on parity with those used and in effect by steam railroads operating in Indiana. E. I. Lewis, chairman of the Indiana Public Service Commission, says that the new rates will be lower than the present rates for all hauls of more than 80 miles, lower than most hauls of more than 60 miles and somewhat higher for hauls less than 60 miles. The new rates represent no general increase, but only readjustment all the way through. The increases will not generally exceed 5 per cent of the present rates, but the decreases on the long-haul business are considerable.

**Car Ticket Agencies in Atlanta.**—Seven private agencies for the sale of car tickets to the public and to conductors have been established by the Georgia Railway & Power Company, Atlanta, Ga., which is operating under a 6-cent fare with seventeen tickets for $1. Among these seven agencies every route in Atlanta is provided with one or more ticket reservoirs that its cars pass on every trip. The order of the company requests conductors who purchase books at these sub-agencies to use bills in payment, rather than small change, and so to be as little trouble as possible to the people who are handling this service for the company. Conductors are required to start their runs with $10 worth of books, which are issued to them on credit. They can replenish their supply while on duty by purchasing from representatives of the company at downtown points. These new sub-agencies will provide against emergencies overtaking conductors out on their routes.

# Personal Mention

## Mr. Townley Heads A. I. E. E.

**Manufacturer, Former Railway Operator, Elected President of American Institute of Electrical Engineers**

Calvert Townley, assistant to the president of the Westinghouse Electric & Manufacturing Company and formerly vice-president of the Connecticut Company, New Haven, Conn., was on May 16 elected president of the American Institute of Electrical Engineers.

Since leaving the operating railway field Mr. Townley has maintained an active interest in railway operation, being at present chairman of the American Electric Railway Association committee on electrolysis. He is chairman of the public policy committee of the A. I. E. E. Mr. Townley was graduated from Yale University in 1886 and later received the degree of mechanical engineer from that university. Immediately after graduation he joined the technical staff of the Westinghouse Electric & Manufacturing Company and from the first showed an interest in electric railway problems. After securing extensive experience in the company's works at Pittsburgh, he was transferred to the Boston office in 1895. Nine years later he took charge of and consolidated for the New Haven Railroad the electric railways which that company had recently purchased in Connecticut. After the formation of the consolidated company he was elected its vice-president. This position he resigned in the summer of 1911 to take up his present work.

CALVERT TOWNLEY

In connection with his duties with the Westinghouse Company Mr. Townley also served for a time as president of the Lackawanna & Wyoming Valley Rapid Transit Company, Scranton, Pa., and its subsidiary companies, representing the Westinghouse interests in that property.

**Fred D. Fauser**, claim agent for the Peoria (Ill.) Railway, included in the Illinois Traction System, has accepted the position of chief claim agent for the St. Louis (Mo.) Terminal Railroad Association.

**Edward M. Hunt**, assistant counsel and director of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has returned from overseas, where he was a captain in the service of the American Red Cross in France.

**Leon C. Smith**, Columbus, Ohio, has been provisionally appointed chief inspector by the Public Utilities Commission of Ohio to succeed James B. Dugan, who recently resigned to become superintendent of the Lima division of the Ohio Electric Railway. Mr. Smith has been assistant to Mr. Dugan.

**Robert R. McCoy** has been appointed superintendent of the southern division of the Illinois Traction System, with headquarters at Staunton, Ill. Mr. McCoy has recently been discharged from military service. He has been serving the Illinois Traction System at Springfield, Ill., for a number of weeks as trainmaster.

**Roy W. George** has been appointed superintendent of Division B of the Georgia Railway & Power Company, Atlanta, Ga., succeeding J. M. Means, who has become assistant superintendent of transportation. Mr. George is only thirty-five years old. He became connected with the company at Atlanta in 1902, but left the service for three years and returned in 1906. He was appointed dispatcher in 1915

**E. A. Wetmore**, who resigned as treasurer of the Boise Valley Traction Company and the Idaho Power Company in July, 1918, has since that time been connected with the ordnance department of the War Department. At present he is supervisor of the finance section of the Ordnance Department for several war contracts which are now being concluded. These are being carried out in Alabama. Mr. Wetmore has not determined upon his future plans, but may return to the electric railway business.

**L. M. Helmreich**, until recently assistant engineer to the Public Utilities Commission of Missouri, has been appointed engineer of the newly organized Arkansas Corporation Commission to take charge of the general supervision of the utilities operating in that State. He will establish headquarters at Little Rock. Mr. Helmreich was formerly head of the Ranken Mechanical School of St. Louis. He was graduated from the University of Missouri with the degrees of mechanical engineer and electrical engineer.

## Edison Medal to Mr. Lamme

**A. I. E. E. Award for Meritorious Achievement in Electrical Science Goes to Chief Engineer Westinghouse Company**

Benjamin G. Lamme on May 10 was awarded the Edison medal by the American Institute of Electrical Engineers for meritorious achievement in electrical science, electrical engineering, and the electrical arts. In making the award the institute refers particularly to his work as pioneer in alternating current railway development. Mr. Lamme has been chief engineer of the Westinghouse Electric & Manufacturing Company for more than fifteen years. He was born in Springfield, Ohio, fifty-five years ago, and was graduated from the Ohio State University as a mechanical engineer in 1888.

Almost immediately after graduation Mr. Lamme entered the testing department of the Westinghouse Company and he has been continuously with the company ever since. During thirty years he has invented and designed many important pieces of alternating and direct-current apparatus, including railway generators and motors, and holds about 140 patents, many of which are of fundamental importance. In 1900 he was made assistant chief engineer of the company, becoming chief engineer three years later.

B. G. LAMME

Aside from Mr. Lamme's personal engineering activities he acts in an advisory capacity to the whole engineering interests of the company, and is chairman of the company's committee which passes upon new inventions and appliances. He is the author of many technical papers presented before engineering societies. In 1915, upon nomination of the A. I. E. E., he was appointed by the Secretary of the Navy to membership on the Naval Consulting Board, where he served during the period of the war.

**J. M. Means** has been appointed assistant superintendent of transportation of the Georgia Railway & Power Company, Atlanta, Ga. Mr. Means has been in the service of the company and its predecessors since 1895, with the exception of six years spent in government work. He was appointed division superintendent of the company in 1909. His appointment as assistant superintendent gives the transportation department two assistant superintendents, C. H. Mathews having served in that capacity since January, 1911.

**J. L. Murphy** has been appointed industrial representative of the Georgia Railway & Power Company, Atlanta, Ga., including the Atlanta Gas Light Company, the Atlanta Northern Railroad and all other subsidiary companies, both inside and outside the 7-mile zone. The industrial representative will work to secure closer relations of co-operation and mutual benefit between the management of the company and its employees. He will try to secure the carrying out of the contracts between the company and the labor unions or associations, not only in letter but in spirit. To this end he will confer with the committees representing the unions and with the rank and file of the employees. He will report direct to the chairman of the board of directors, or the president.

**Edward D. Ransom** has resigned as assistant engineer for the mechanical department of the Brooklyn (N. Y.) Rapid Transit Company to accept the position of sales engineer in the New York electrical department of the H. W. Johns-Manville Company. Mr. Ransom received his technical education at Union College, Schenectady, where he was graduated in 1910 with the degree of Bachelor of Engineering. He entered the service of the Brooklyn Rapid Transit Company in 1912 as wireman at the Thirty-ninth Street general construction shops. He later served as testing inspector and in 1915 was promoted to the position of assistant engineer. Since that time he has been engaged in operating engineering work for the company. Mr. Ransom has contributed several articles on car equipment maintenance to the ELECTRIC RAILWAY JOURNAL.

**Lynn B. Milam** has been appointed by Mayor Wozencraft of Dallas, Tex., as supervisor of public utilities to succeed M. N. Baker, who resigned with the change in city administration. The appointment has been confirmed by the City Commissioners. Mr. Milam was born in South Dakota, and his parents moved to Texas shortly afterward. He was educated in the public schools of Dallas, and later attended Drury College at Springfield, Mo., and took a course in law at the University of Texas, where he received the degrees of A. B. and LL. B. He entered the newspaper field, but after working for a short time in Dallas and Austin he gave up newspaper work and began the practice of law. He has specialized in corporation law and was associated with the Dallas firm of Thomas, Milam & Touchstone. Mr. Milam had no experience in traction matters other than in the practice of law until his appointment as supervisor of public utilities.

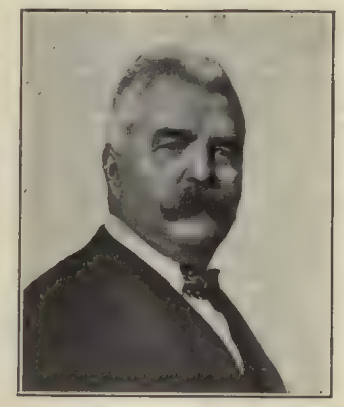
# Obituary

## Prepayment Inventor Dead

### Duncan MacDonald, Inventor and Former Manager of Montreal Street Railway, Died May 8

Duncan MacDonald, formerly manager of the Montreal (Que.) Street Railway, who invented and patented the pay-as-you-enter system of car operation adopted in Montreal in 1905, died of tuberculosis at St. Agathe on May 8.

The great work for which Mr. MacDonald will always be remembered by the industry was his development of the pay-as-you-enter car in conjunction with W. G. Ross, then general manager of the Montreal Street Railway. It took a great deal of courage to believe that the public as well as the operators would appreciate the benefit of changing from collection within the car to collection on the platform. Mr. MacDonald and his associates, however, acted on the theory that the change would be successful if it was accompanied by improvements in car construction and service that carried assurance to the public that the modification of fare collection practice was intended primarily for their advantage. Thus the inauguration of prepayment was the impulse which led to such remarkable improvements in the design, equipment and operation of rolling stock on the city railways in the United States and Canada.



DUNCAN MACDONALD

Mr. MacDonald was born on June 17, 1859, at St. Thomas, Que. He was educated at Rimouski College. He entered electric railway work as a conductor when he was twenty years old and served as roadmaster, inspector, assistant superintendent, engineer and general manager of the Montreal Street Railway. His continuous service at Montreal was broken, however, during the period 1902 to 1904 when he was employed as managing director for 400 miles of tramway in and around Paris, France.

Mr. MacDonald resigned his position as general manager at Montreal on July 5, 1912, and opened offices there to devote his time to various interests with which he was identified. On April 6, 1914, he was elected a member of the Board of Control by the city of Montreal and served as a controller for two years. In the civic elections of April 3, 1916, he was a candidate for the office of Mayor but was defeated. He retired to private life in 1916. He was president of the Montreal Tunnel Company, Montreal; president of the South Shore Land & Improvement Company; vice-president of the Dominion Park Company and, following the development of the prepayment car, was president of the Prepayment Car Sales Company.

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**Paul Lüpke**, one of the pioneers in the electrical industry, died on Feb. 9. Mr. Lüpke was born in Osnabrück, Germany, in 1861, and was educated at the local Real-Gymnasium and at the Royal Polytechnic Institute, Stuttgart, Württemberg. Prior to coming to the United States in 1884 he had been connected with the Siemens & Halske Works in Charlottenburg and the Allgemeine Elektrizitäts-Gesellschaft in Berlin. At the time of his death Mr. Lüpke was in charge of the extensive library of the three companies which make up the Public Service Corporation of New Jersey, besides being editor of *Service*, the official publication of the corporation. For many years he was superintendent of the southern division of the Public Service Electric Company at Trenton, N. J.

**Emil Swensson**, for twenty years a consulting engineer of the Manhattan Elevated Railway, New York, and for nearly as long a technical adviser of the Pittsburgh (Pa.) Railways, died on May 13 in his home in Pittsburgh. Mr. Swensson was born in Sweden and was educated in the government technical schools of that country, coming to the United States shortly after graduation. He started as a draftsman, but soon became division engineer of survey and construction for the ill-fated South Penn Railroad project. Later he was connected with the American Bridge Company, but resigned from that company to take up private practice. One of Mr. Swensson's most important works was his study of the Pittsburgh traction situation several years ago. At that time he prepared, at the behest of Mayor George W. Guthrie, a report recommending improvements in construction and treating of subway propositions, that has since proved one of the standard documents in the never-ending discussion of transportation in Pittsburgh. Mr. Swensson designed or helped design many buildings in Pittsburgh, Chicago and New York. He also was widely known as a bridge engineer. He is survived by his widow, a daughter and three sons.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Better Market Ahead

### With Last of Liberty Loans Over Money Should Be Freer for Industry

One, and perhaps the greatest, of the difficulties that lie in the path of the electric railway purchasing agents is that of getting the necessary money. For some time the money market has been in the position of not wanting to place long loans. The demand of the government for money has made it necessary for the banks and other financial interests to keep their assets quick for the government. Now the last of the Liberty Loan campaigns is over. In this drive the banks and other interests with large sums of money to invest were not required to place as much money in the Victory Notes as they had expected. Consequently, the day of freer money for the industries among which must be included the electric railways appears to be nearer.

Easier money should mean greater expenditures by the electrics and therefore better market conditions. For some time the market has been open almost wholly for maintenance equipment. There now seems a possibility of a new equipment market opening up soon in appreciable volume.

## Fare Register Outlook Hopeful

### While Discussing General Business Conditions, John F. Ohmer Tells of Increasing Production

Well-defined prosperity ahead was the keynote of an interview on general business conditions in the Dayton *Sunday Journal* with John F. Ohmer, president of the Ohmer Fare Register Company, being one of a series with Dayton business leaders. The following paragraphs taken from the interview are particularly interesting.

"There is going to be," said Mr. Ohmer, "a great scarcity of labor within the next few months.

"Unfortunately, there is a tendency among too many people to believe that a reduction or curtailment in the amount of production is necessary in order to stimulate the demand for labor. They overlook the fact that we must have greater production in order to reduce the cost of manufacturing.

"Because of the depleted world stocks I can see no hope of a reduction in the high cost of manufacturing or the high cost of living for another year, after which we will enter into a plane of business never before experienced, and this will continue for several years.

"In our own business we still are engaged in filling our contracts for the government, but we are gradually tapering down this production for government purposes and proportionately increasing the production of our own commodities, the demand for which is very good at this time. With the final development of new things in our line, the outlook is most hopeful."

## Automatic Substation Equipment Demand Increasing

### Factory Production at Capacity with Sales Largely to Long Interurban Systems

One of the more recent developments in electric railway work is the automatic substation. Its utilization, at first rather slow, has increased in a satisfactory manner and present manufacturing capacity has been reached. It is not meant that substation equipment is up to manufacturing capacity, but merely the automatic equipment necessary to convert manually operated substations to automatically operated. While rotaries are running about three months delivery the automatic control is up to four and five months.

The cost of automatic equipment cannot be given as any fixed percentage of the cost of the remainder of the substation. That is, the cost to equip with automatic control a 600-kw. station would not be double that for a 300-kw. station. There would be a slightly higher cost for the larger capacity contactors, buses, etc., but nothing in proportion to double. The difference in cost for substations of different voltage, however, runs in the neighborhood of 10 to 15 per cent increase for the higher primary voltages.

To offset the cost of the automatic equipment there is found reduced labor costs for operation, smaller substation equipment and better copper distribution along the line. Labor charges in substation operation are considerable and the main feature of this equipment is the reduction in labor.

Frequently the capacity of the station equipment may be reduced under automatic control to about 80 per cent on the direct-current side. This may mean considerable saving in copper and equipment.

Large interurban lines have special adaptation for this automatic equipment, as the substations run for rather long periods of time without load. The West and Middle West have taken to this equipment more than has the East, and naturally so, as there is more heavy interurban traffic in these sections.

## Outlook on Prices

### Price of Labor Cannot Yet Come Down, Says Roger W. Babson—Few Radical Declines Looked For

A recent statement by Roger W. Babson, dealing with the outlook on prices, states that "No single question appears to bear more vital relation to the speedy return of nation-wide prosperity than the question of prices. With each month that has passed since the signing of the armistice, developments have tended to upset preconceived ideas as to exactly what would happen. The one outstanding fact is that in spite of the most highly competitive conditions, brought on by a scarcity of orders in many industries, prices have not materially receded, excepting for raw materials.

"Many who have pinned their faith to lower prices are pointing to declines in the cost of a few raw materials like cotton, wool and leather. They forget that wearing apparel and other manufactured products, before reaching the public, have gone through so many hands and processes, all requiring labor in its broadest sense, that the final cost is largely determined by the labor cost. We should not forget that 75 per cent or more of the total cost of most commodities consists in labor in some form or other. The price of labor cannot come down in this country as long as we have the present potential scarcity of workers, great latent demand for goods, high taxation and world scarcity of food.

"Exactly what will happen to prices in the near future no one can of course definitely foretell. However, expectations which are entertained as to speedy and radical declines, except where profits can be shown to be excessive, are apparently based more on hope than on a careful study of the law of supply and demand. Raw materials and foodstuffs will be lower; but otherwise we surely are on a new price level for some time to come. There is little likelihood of a sudden fall in manufactured goods in the near future beyond the elimination of war prices made necessary to stimulate production in high cost plants."

## Guy Insulators Slightly Higher

In the market for line material there has been reported an increase of 5 per cent in the price of high-voltage porcelain guy insulators. No special increased domestic demand has been noted. Factory deliveries have been given as two weeks. On line material in general, however, there has been a favorable increase in foreign demand.

## Trade Opportunities Abroad

A man in Switzerland (No. 29,115) desires to secure an agency for the sale of electrical apparatus such as dynamos or electric locomotives. Correspondence may be in English. A firm in this country (No, 29,153) with a branch in Italy, and also proposing to open offices in other European countries, desires to secure agencies for the sale of electrical railway equipment, insulated wires and cables. Where the item is numbered, further information can be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., by mentioning the number.

## Rolling Stock

**Madison (Wis.) Railways** announces its intention to purchase fifteen one-man safety cars.

**Richland Public Service Company, Mansfield, Ohio,** has ordered two sets of General Electric air brakes for cars formerly equipped with hand brakes.

**North Branch Transit Company, Bloomsburg, Pa.,** announces that there is under construction for that road one trailer dump ash car and one two-motor work and ash car.

**Cincinnati Traction Company, Cincinnati, Ohio,** announces through vice-president Walter A. Draper that an order has been placed for 105 new double truck, pay-within type, four-motor cars.

## Recent Incorporations

**Bay City Southern Railroad, Lansing, Mich.**—Articles of incorporation will be filed with the Michigan Railroad Commission by the Bay City Southern Railroad, which plans to construct a combination gas and electric line to connect Lansing, Dewitt, St. Johns, Mape Rapids, Middleton, Perrinton, Ithaca, St. Louis, Breckenridge, Wheeler, North Wheeler, Midland, Bay City, west and east sides, 125 miles. The road will be capitalized at $1,000,000. It is reported that the proposition involves the purchase of the Lansing-St. John's line of the Michigan United Railways and the Midland-Bay City branch of the Michigan Central Railroad.

## Franchises

**Sacramento, Cal.**—The Pacific Gas & Electric Company has asked the City Commission of Sacramento for a ten-year extension of its franchise on J Street between Second and Third Streets.

**Detroit, Mich.**—The Detroit & Lake St. Clair Railway (a part of the Detroit & Port Huron Shore Line Railway) has been granted a thirty-year franchise by the City Council to construct a double track on Fisher Road and Grosse Pointe Boulevard, from Jefferson Avenue to Weir Lane.

**Trenton, N. J.**—The Trenton & Mercer County Traction Corporation has received permission from the City Commission of Trenton to construct double tracks on Mulberry Street and Center Street.

## Track and Roadway

**Trinidad, B. W. I.**—According to Consul Baker, Trinidad, British West Indies, is seeking more up-to-date equipment for its railways. Plans are under way to improve yard and shop lighting and two oil engine lighting generators of about 50-kw. capacity each are needed. Stations are to be lighted by a battery system at present used on the cars. Hand brakes are to give way to air equipment.

**Municipal Railway of San Francisco, San Francisco, Cal.**—Work will be begun May 20 on the relocation of the tracks of the Union Street line of the Municipal Railway. The double track on Union Street will be extended from Franklin Street to Van Ness Avenue and a new connection will be made between the tracks in Vallejo Street and in Van Ness Avenue by a double track out of Vallejo Street into Van Ness. All the present track in Franklin Street and in Vallejo west of Union will be removed. The new route of the Union Street cars will be from Vallejo Street into Van Ness Avenue and northerly along Van Ness to Union and then west on Union.

**Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.**—The Fort Wayne & Northern Indiana Traction Company will double-track its line on Calhoun Street between Creighton Avenue and Pontiac Street.

## NEW YORK METAL MARKET PRICES

| | May. 1 | May 15 |
|---|---|---|
| Copper, ingots, cents per lb | 15 37½ | 16 00 |
| Copper wire base, cents per lb | 17.25 to 18 00 | 17.25 to 18.00 |
| Lead, cents per lb | 5.00 | 5 00 |
| Nickel, cents per lb | 40.00 | 40.00 |
| Spelter, cents per lb | 6.45 | 6.40 |
| Tin, cents per lb | †72.50 | †72.50 |
| Aluminum, 98 to 99 per cent., cents per lb | 31.00 to 33.00 | 32 00 |

† Government price in 25-ton lots or more f.o.b. plant.

## OLD METAL PRICES—NEW YORK

| | May 1 | May 15 |
|---|---|---|
| Heavy copper, cents per lb | 13 50 to 13.75 | 13.50 to 14 00 |
| Light copper, cents per lb | 11 00 to 11.25 | 11.00 to 11 25 |
| Heavy brass, cents per lb | 7.50 to 8.00 | 7.50 to 8.00 |
| Zinc, cents per lb | 5.25 to 5.50 | 5 00 to 5.25 |
| Yellow brass, cents per lb | 6.50 to 7 00 | 6.50 to 7.00 |
| Lead, heavy, cents per lb | 4.00 to 4 25 | 4.25 to 4 37½ |
| Steel car axles, Chicago, per net ton | $23 00 to $25 00 | $23.00 to $24 00 |
| Old carwheels, Chicago, per gross ton | $21 00 to $22 00 | $21.00 to $22 00 |
| Steel rails (scrap), Chicago, per gross ton | $17 00 to $17 50 | $16 50 to $17 00 |
| Steel rails (relaying), Chicago, gross ton. | $17 00 to $17 50 | $16 50 to $17.00 |
| Machine shop turnings, Chicago, net ton | $6.00 to $7 00 | $6 00 to $6 50 |

## ELECTRIC RAILWAY MATERIAL PRICES

| | May 1 | May 15 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb | 20 | 20 |
| Weatherproof wire (100 lb. lots), cents per lb., New York | 23 00 to 23.25 | 23.00 to 23.25 |
| Weatherproof wire (100 lb. lots), cents per lb., Chicago | 23.75 to 37.35 | 23.75 to 37.35 |
| T rails (A. S. C. E. standard), per gross ton | $49 00 to $51 00 | 49.00 to 51.00 |
| T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton | $47 00 to $49 00 | 47.00 to 49.00 |
| T rails (A. S. C. E. standard), 500 ton lots, per gross ton | $45.00 to $47.00 | 45.00 to 47.00 |
| T rail, high (Shanghai), cents per lb | 3 | [illegible] |
| Rails, girder (grooved), cents per lb | 3 75 | 3.75 |
| Wire nails, Pittsburgh, cents per lb | 3.25 | 3.25 |
| Railroad spikes, drive, Pittsburgh base, cents per lb | 3 35 | 3 35 |
| Railroad spikes, screw, Pittsburgh base, cents per lb | 8 | [illegible] |
| Tie plates (flat type), cents per lb | 2.75 | 2.75 |
| Tie plates (brace type), cents per lb | 2.75 | 2 75 |
| Tie rods, Pittsburgh base, cents per lb. | 7 | 7 |
| Fish plates, cents per lb | 3 | 3 |
| Angle plates, cents per lb | 3.90 | 3 90 |
| Angle bars, cents per lb | 3.90 | 3.90 |
| Rail bolts and nuts, Pittsburgh base, cents per lb | 4 35 | 4.35 |
| Steel bars, Pittsburgh, cents per lb | 2 35 | 2.35 |
| Sheet iron, black (24 gage), Pittsburgh, cents per lb | 4 20 | 4.20 |
| Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb | 5.25 | 5.25 |
| Galvanized barbed wire, Pittsburgh, cents per lb | 4.10 | 4.10 |

| | May 1 | May 15 |
|---|---|---|
| Galvanized wire, ordinary, Pittsburgh, cents per lb | 3.70 | 3.70 |
| Car window glass (single strength), first three brackets, A quality, New York, discount † | 80% | 80% |
| Car window glass (single strength, first three brackets, B quality), New York, discount | 80% | 80% |
| Car window glass (double strength, all sizes AA quality), New York discount | 81% | 81% |
| Waste, wool (according to grade), cents per lb | 14 to 17 | 14 to 17 |
| Waste, cotton (100 lb. bale), cents per lb. | 8 to 13½ | 8 to 12½ |
| Asphalt, hot (150 tons minimum), per ton delivered | ..... | ..... |
| Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton | | |
| Asphalt filler, per ton | $30.00 | $30.00 |
| Cement (carload lots), New York, per bbl | $2.90 | $2 90 |
| Cement (carload lots), Chicago, per bbl. | $3.05 | $3 05 |
| Cement (carload lots), Seattle, per bbl. | $3.13 | $3.13 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal | $1.61 | $1 59 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal | $1.68 | $1.61 |
| White lead (100 lb. keg), New York, cents per lb | 13 | 13 |
| Turpentine (bbl. lots), New York, cents per gal | 78 | 78 |

† These prices are f. o. b. works, with boxing charges extra.

**Bangor Railway & Electric Company, Bangor, Me.**—Work is progressing on the reconstruction of the Center Street line of the Bangor Railway & Electric Company. This is the first of a series of improvements to be made by the local company during the present year, including the reconstruction of its line on Garland Street.

**New York Municipal Railway, Brooklyn, N. Y.**—Among the first official acts of Lewis Nixon, who was recently appointed Public Service Commissioner for the First District of New York to succeed Travis H. Whitney, Charles S. Hervey and Frederick J. H. Kracke, was the awarding of a contract to Thomas Crimmins Contracting Company, New York, for the installation of tracks in the Sixtieth Street Tunnel portion of the Broadway subway, at $94,073. This line connects the Brooklyn Rapid Transit subway in Manhattan with the existing elevated lines in the northern portion of Queens over which the Brooklyn Rapid Transit possesses trackage rights in connection with the Interborough Rapid Transit Company. Commissioner Nixon has also urged the Board of Estimate and Apportionment to give its early approval to a contract for the completion of the elevated portion of the Pelham Bay Park branch of the Lexington Avenue subway, which is urgently needed to provide rapid transit for the extreme eastern portion of The Bronx. Commissioner Nixon also directed the beginning of operation of a new portion of the Culver elevated railroad in Brooklyn from Kings Highway to Avenue X.

**Richland Public Service Company, Mansfield, Ohio.**—A report from the Richland Public Service Company states that it has just ordered 105 tons of 100-lb. A.R.A. type A rail for 3500 ft. of track reconstruction, 600 International twin steel ties and one left-hand branch-off and one diamond turnout.

**Grand River Railway, Galt, Ont.**—The Grand River Railway contemplates the reconstruction of 7½ miles of track between Preston and Kitchener with 80-lb. rails.

## Power Houses, Shops and Buildings

**Arizona Power Company, Prescott, Ariz.**—A 4000-volt electric power transmission line will be erected by the Arizona Power Company from its power station near Highball to Phoenix, 70 miles. The purpose of the proposed line is to provide auxiliary power for the system of the Pacific Gas & Electric Company at Phoenix. The company also has other important extensions to its power system under consideration.

**Iowa Southern Utilities Company, Centerville, Iowa.**—David G. Fisher & Company, Davenport, Ia., who now control the Iowa Southern Utilities Company, plan important improvements to the power plant of that company at Centerville.

**Tri-City Railway & Light Company, Davenport, Iowa.**—The Moline & Rock Island Manufacturing Company, a subsidiary of the Tri-City Railway & Light Company, has asked for bids on the erection of a $40,000 concrete stack, 237 ft. high, with an inside diameter at the top of 13 ft. 6 in. Eight steel stacks now serve the boilers at this plant. The concrete stack will replace them.

**Springfield (Mass.) Street Railway.**—A contract has been awarded to E. J. Pinney by the Springfield Street Railway for the alteration of its carhouse on Bond Street at a cost of about $15,000.

**Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.**—Plans have been completed by the Grand Rapids, Grand Haven & Muskegon Railway for the construction of a portable automatic substation at a cost of about $30,000.

**Kansas City & Leeds Electric Railway, Kansas City, Mo.**—The Kansas City & Leeds Electric Railway, which proposes to construct a line from Kansas City to Leeds, will erect an interurban station at Thirty-first and Hardesty Streets. The structure will be 300 ft. x 125 ft., six stories and basement, of terra cotta, steel and reinforced concrete with composition roof. The cost will be about $150,000.

## Trade Notes

**Ohio Brass Company, Mansfield, Ohio,** announces that on May 1, its Chicago office moved from 508 Fisher Building to 1217 Fisher Building, 343 South Dearborn Street.

**Capt. J. A. McIntosh,** who has been in the service overseas with the Tank Corps, has returned to his former position in the engineering department of the Ohio Brass Company.

**Wheeling Condenser & Engineering Company, Carteret, N. J.,** reports that in the month of April it manufactured and shipped 879,900 lb. of seamless drawn brass and copper condenser tubes.

**E. C. Camp** has been elected assistant treasurer, assistant to the president, of the Solar Metal Products Company, Inc., Columbus, Ohio. He continues his work as sales manager in charge of sales and advertising.

**Railway Improvement Company,** New York City, announces that Stone & Webster have placed an order with them through Roscoe Reed, receiver, for a complete equipment of coasting recorders on their Paducah, Ky., property.

**Bittman & Battee, Inc.,** manufacturers' agents, 84 Second Street, San Francisco, have been appointed representatives of the Hazard Manufacturing Company of Wilkes-Barre, Pa., manufacturers of steel and wire rope, electric wires and cables, etc.

**Major Rowland Tompkins, A. E. F.,** formerly associated with Almirall & Company, Inc., New York City, has become a member of the Shevlin Engineering Company, Inc., 110 West Thirty-fourth Street, New York City, manufacturer and contractor for the installation of boiler-plant equipment.

**Ross F. Hayes,** for the past twelve years Eastern manager of the Curtain Supply Company, of Chicago, has been appointed general sales manager of the company. Mr. Hayes will make his headquarters at his former office, 30 Church Street, New York, and will also act as Eastern manager of the company.

**J. N. Ebling** has returned from service with the American Expeditionary Forces in France and has resumed his duties as president of the Railway Specialties Corporation, 30 Church Street, New York City. He announces that D. A. Munro, former secretary of the corporation, is no longer connected with it.

**Western Electric Company, New York, N. Y.,** reports several changes in its organization, to take effect June 1. Among them, J. M. Skinkle, formerly with the engineering department, has been appointed assistant manager of the government department with headquarters at New York; J. A. Pizzini, formerly sales manager at the New York office, has been appointed assistant manager at the same place; W. J. Drury, until recently manager of the Cleveland office, succeeds Mr. Pizzini; A. M. Collins, formerly sales manager of the Detroit office, succeeds Mr. Drury, and A. R. Maynard, until recently with the sales department in Chicago, succeeds Mr. Collins.

**William J. Norton** of Norton, Bird & Whitman has completed his work as general superintendent of the Aberdeen Proving Ground Contract of the Maryland Dredging & Contracting Company, and, in addition to his offices in Chicago, Baltimore and Boston, has opened offices in the Astor Trust Building, 501 Fifth Avenue, New York City, where he will continue his consulting work on utility rate regulation problems. In addition, in association with The Withington-Roberts-Wright Company, of Cleveland, Ohio industrial architects and engineers, he will engage in general industrial engineering, including certain large construction projects upon which preliminary surveys are now under way. It is of interest that Travis H. Whitney, who has just retired as chairman of the New York City Public Service Commission, will become counsel to Mr. Norton and his associates, occupying offices with them at 501 Fifth Avenue, New York City, and will also be associated with them in projected enterprises.

## New Advertising Literature

**Trading With China.**—The Guarantee Trust Company of New York City has issued a pamphlet entitled "Trading with China," in which are set forth methods found successful in dealing with the Chinese.

# Peacock Brakes from Coast to Coast

## Chicago's cars are fast and heavy —so they use Peacocks

Every railway man knows with what great care the Chicago Railways and the Board of Supervising Engineers selected the surface cars and their equipments following the great reorganization some years ago.

At that time, as today, the Peacock Brake stood in the front ranks and was made standard.

Half-a-dozen years or more of service in the congested frequent-stop operation within the Loop and over the outlying high-speed sections have proved the choice of Peacock Brakes fully justified whether for ordinary conditions or the phenomenally harsh weather of last winter.

As the Peacock has made good on these cars, many of which average 53,000-lb. and have high rates of acceleration, there is no question about their ability to do even better on the lighter cars that you are building today.

*Next Stop*—MICHIGAN

**National Brake Co.**
**Buffalo, N. Y.**

# Bankers and Engineers

**Ford, Bacon & Davis,**
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

**THE J. G. WHITE COMPANIES**
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK
LONDON CHICAGO

**STONE & WEBSTER**
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

**JOHN A. BEELER**
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

**SANDERSON & PORTER**
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

**REPUBLIC ENGINEERS, INC.**
CONSULTING AND CONSTRUCTING ENGINEERS
*Valuations Reports Investigations*
*Designs Construction Management*
60 BROADWAY, NEW YORK
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Illuminating Bldg. Mahoning Bank Bldg.

**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

**WOODMANSEE & DAVIDSON ENGINEERING CO.**
ENGINEERS
CHICAGO
784 Continental & Commercial National Bank Bldg.

**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

**ENGELHARDT W. HOLST**
*Engineer*
*Reports, Appraisals, Reorganizations*
683 Atlantic Ave., Boston, Mass.

**A. L. DRUM & COMPANY**
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

**GARDNER F. WELLS**
CONSULTING ENGINEER
PUBLIC UTILITIES
FINANCE OPERATION
SUPERVISION OF CONSTRUCTION
43 Cedar Street, New York

**THE P. EDW. WISH SERVICE, Inc.**
*Suite* 1710 DETECTIVES *Suite* 715
Park Row Bldg., New York Board of Trade Bldg., Boston

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

**ELECTRICAL TESTING LABORATORIES**
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

**Scofield Engineering Co.** Consulting Engineers PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

AMERICAN BRIDGE COMPANY

HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

*Manufacturers of Steel Structures of all classes particularly* BRIDGES AND BUILDINGS

*Sales Offices*

*NEW YORK, N. Y. . . . 30 Church Street*
*Philadalphia, Pa. . . . . Widener Building*
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*Cincinnati, Ohio . . . . Union Trust Building*
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*CHICAGO, ILL. . 208 South La Salle Street*

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*Minneapolis, Minn. . . 7th Ave. & 2nd St., S. E.*

*Pacific Coast Representative:*
*U. S. Steel Products Co., Pacific Coast Dept.*
*San Francisco, Cal. . . . . Rialto Building*
*Portland, Ore. . . . . . . Selling Building*
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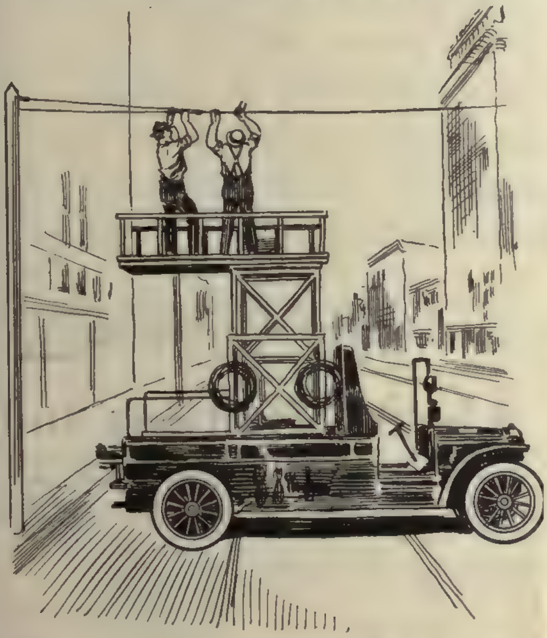
*Export Representative: United States Steel Products Co., 30 Church St., N. Y.*

**When Answering Emergency Calls You Need Rome Electrical Wires**



WHEN an emergency call comes in—"trolley wire down and burned off"—that's the time you need a supply of Rome Trolley Wires—Round Grooved or Figure 8—right on the wagon ready for use.

The uniform high quality of Rome Trolley Wires have made them the favorites of street railway men who know from experience that they have less "trouble calls" when there's Rome Wire "on the job".

Car wire, feeder cables, magnet wire, wire adapted to every requirement and all of Rome Quality are ready for prompt shipment—where shall we ship your order?

**Rome**
**Wire Company**
**Rome, N. Y.**

# Confidence

## is the basis of
## Prosperity

Confidence in the future of the electric railway industry rests squarely on the fact that modern civilization must have more and better electric railway transportation.

This one fact, clearly kept in mind, must breed optimism.

Every manufacturer of electric railway equipment and supplies owes it to the industry which has built his business to reflect and propagate confidence in the future.

He can do this most effectively by showing that he thinks enough of his own business future to insure it against depreciation.

Advertising is the best and cheapest business insurance.

The only business that cannot believe in advertising is the business that does not believe in its own future.

The Electric Railway Journal covers all departments of the industry—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.

**Electric Railway Journal**
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.
Tenth Ave. at 36th St., New York

T-S
COMPANY

$300,000,000
WORTH OF ARGUMENT

During the past eighteen years the amount of construction and engineering work undertaken by the Thompson-Starrett Company is considerably in excess of $300,000,000.

This work has embraced almost every conceivable type of construction and engineering, from factories to skyscrapers, from industrial plants to railroad terminals, from power houses to grain elevators, from warehousing facilities to housing developments, covering an itinerary of 75 cities, and constituting an unbroken chain of engineering achievement from the Atlantic to the Pacific.

Yet we recall no Owner whom we failed to satisfy, no promise we failed to perform, no contract date we failed to fulfil, no obligation whatever which was not observed according to the letter and the spirit of the specifications.

THOMPSON-STARRETT COMPANY
INDUSTRIAL CONSTRUCTION
CHICAGO NEW YORK PITTSBURGH

*Our Advice is as Good as Our Service*

**Waste Inefficiency Fire Risk**
**Versus**
**Economy Efficiency Safety**

These two factions are on trial in your car house today if you still maintain the antiquated oil barrel. There can only be one verdict—in favor of

**GILBERT & BARKER**
**OIL HANDLING OUTFITS**

Their economy consists in the saving of oil, because the containers are leak-proof, dust-proof and dirt-proof. There is no evaporation. The efficient pumps as shown in the square insert were installed in the Main Oil Room of a large Street Railway Co. The tanks are located in the basement. The saving of oil by means of these pumps has been so marked that the installation has paid for itself very quickly.

The Superintendent or Railway Executive intent on saving money for his company will do a good day's work by investigating these up-to-the-minute G. & B. Oil Handling Outfits. Write today for Bulletin 60.

**Gilbert & Barker Manufacturing Co.**
**Established 1865**
**Springfield, Mass.**

# TERRY TURBINE DRIVE

## Gives Toledo Railways & Light "Entire Satisfaction"

Says Mr. William Long, Superintendent of Production, Toledo Railways & Light Company, Toledo, Ohio:

**"This photograph was taken from our Terry Turbines direct connected to centrifugal multi-stage pumps, 500 gallons per minute, and is used for boiler feed purposes, against 250 pounds working pressure.**

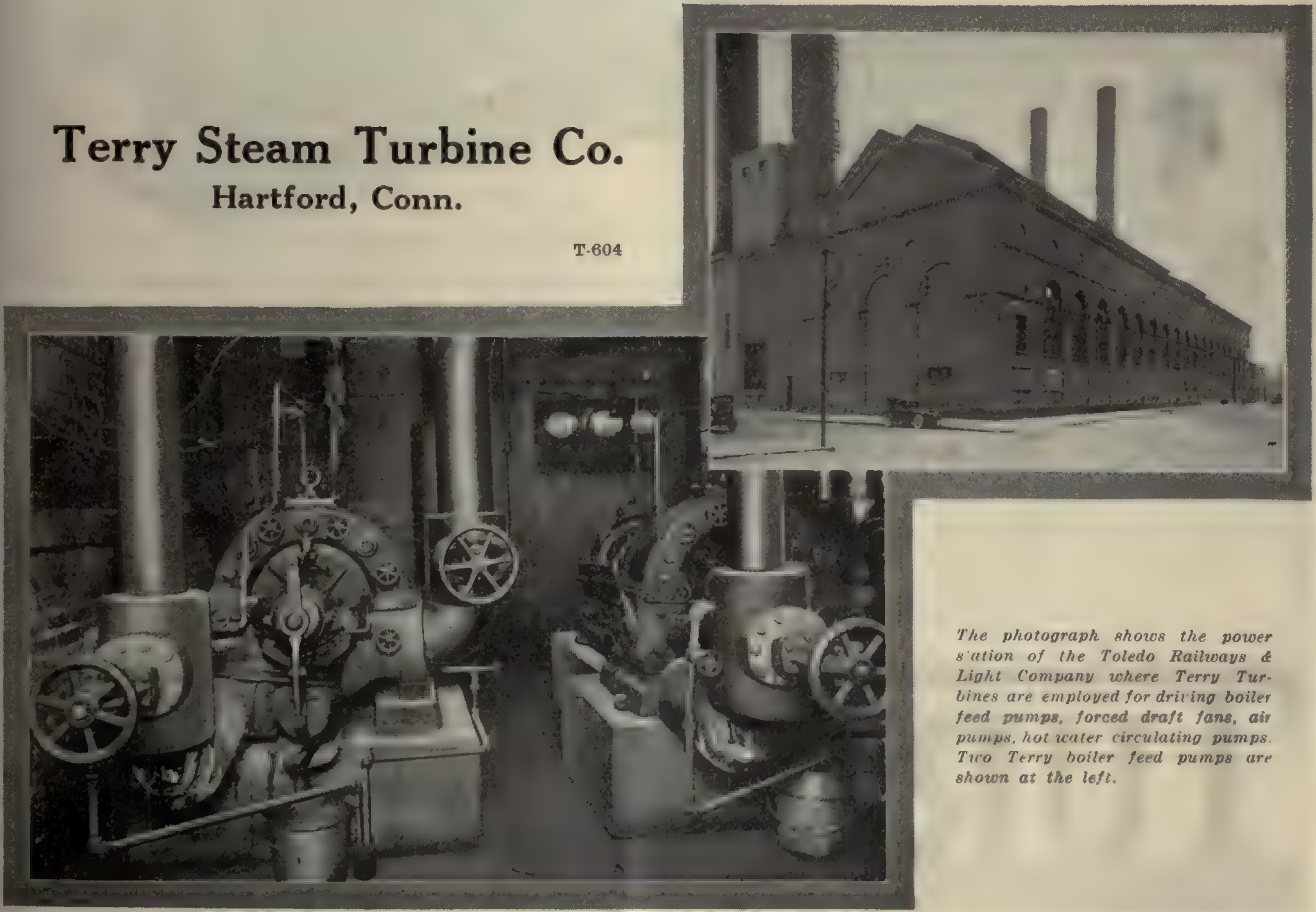
**"This outfit was installed about two years ago and has given us entire satisfaction."**

Many prominent electric railway companies are keeping down the cost of their service by using Terry Turbines for driving their auxiliaries. Flexibility of control, absence of vibration, extreme reliability, and the utmost economy in upkeep, are some of the reasons why the Terry is preferred. Write for Bulletin 2511 and learn why so many engineers advise

***"Specify Terry for driving your auxiliaries."***

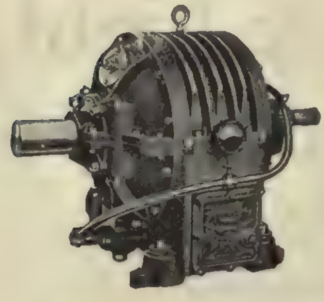
**Terry Steam Turbine Co.**
**Hartford, Conn.**

T-604



*The photograph shows the power station of the Toledo Railways & Light Company where Terry Turbines are employed for driving boiler feed pumps, forced draft fans, air pumps, hot water circulating pumps. Two Terry boiler feed pumps are shown at the left.*

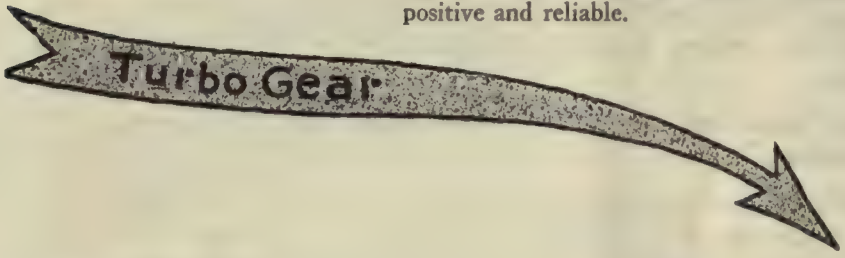
# Making a High Speed Turbine Drive a Slow Speed Oil Pump



The installation below is one of nineteen in which a Terry steam turbine, running at a normal speed of 2460 r. p. m. is made to drive a Kinney rotary pump with a capacity of 1000 gallons per minute at 300 r. p. m.

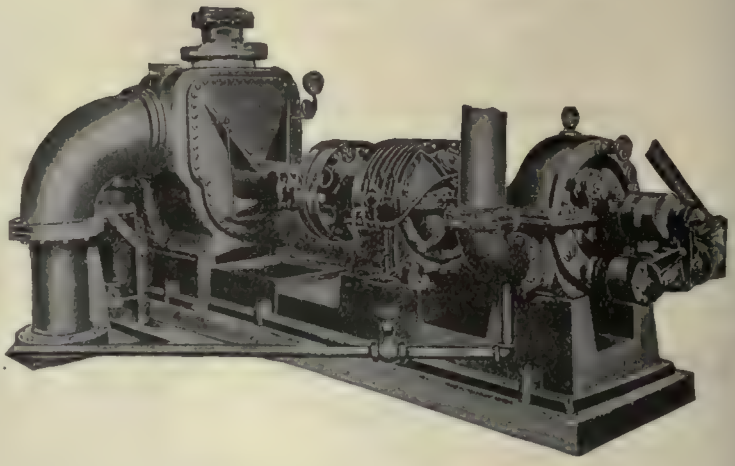
How? Look at that Turbo Gear interposed between the two units. Notice the compact grouping, and the single axial alignment throughout.

Why was Turbo Gear selected? Because it is absolutely dependable, positive and reliable.



This Turbo Gear is rated at 125 h. p. You may obtain Turbo Gears in sizes ranging from 1 h. p. to 20,000 h. p., all warranted to transmit power at any speed change ratio above 4 to 1 with an efficiency of 97%.

With no chains, sprockets or exposed gears of any kind, Turbo Gear is absolutely safe.



*Turbo Gear steps speed up as well as down. Bulletin 101 gives some very interesting facts. Send for a copy today.*

### *District Offices:*

| | |
|---|---|
| CHARLOTTE, N. C. | Realty Bldg. |
| CHICAGO | Old Colony Bldg. |
| DALLAS | 1405 Southwestern Life Bldg. |
| DENVER | First National Bank Bldg. |
| DETROIT | 423 Dime Bank Bldg. |
| EL PASO | 615 Mills Bldg. |
| MILWAUKEE | Wells Bldg. |
| PHILADELPHIA | 215 Drexel Bldg. |
| PITTSBURGH | 781 Union Arcade Bldg. |
| ST. LOUIS | 2211 Olive St. |
| SALT LAKE CITY | 914 Boston Bldg. |
| SAN FRANCISCO | Mills Bldg. |
| SEATTLE | 2012 L. C. Smith Bldg. |

SOLE CANADIAN REPRESENTATIVES
Canadian Fairbanks Morse Co., Ltd.
Branches in all large Canadian Cities

## The Poole Engineering & Machine Co.

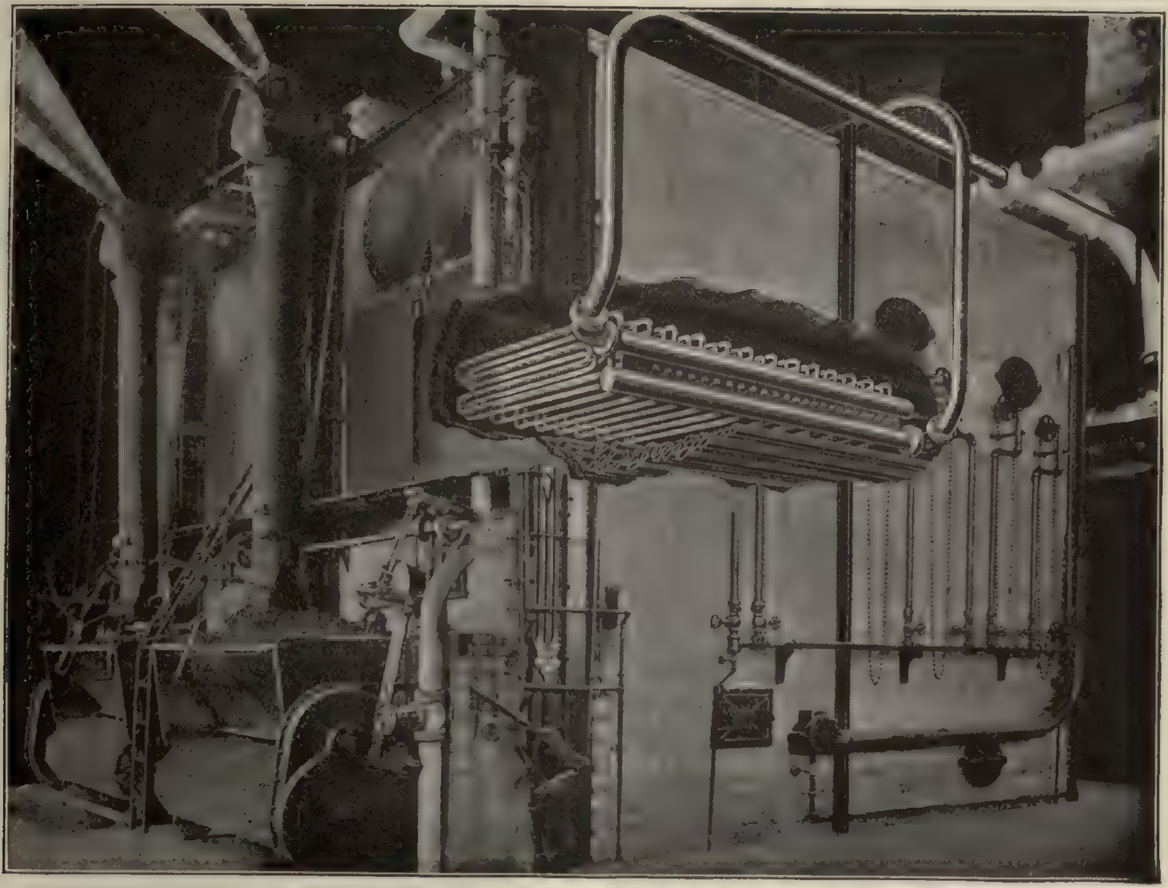
*Manufacturers of Gears and Power Transmission Machinery*
*Since 1843*

**Baltimore, Md., U. S. A.**

**General Sales Office: 50 Church St., New York**

# TURBOGEAR

FAST PATENTS



Elesco Superheater in Stationary Boiler

**Over the Peak with High Efficiency**

The great benefits of superheated steam are most apparent when the maximum demand calls for greater power.

The installation of a correctly designed superheater decreases the loss in efficiency when the boiler is forced. Furthermore, such a superheater eliminates water under all conditions and insures the maximum capacity of your prime mover.

When these advantages are realized in your plant, they represent many dollars saved in your operating costs.

Ask for Bulletin BT-1. It explains why the Elesco Superheater is the practical means to operate your plant efficiently over the peak load.

***Designing engineers and manufacturers of steam superheaters for all purposes.***

**Locomotive Superheater Company**
**General Offices, 30 Church Street, New York**

**CHICAGO**
**Peoples Gas Bldg.**

**PITTSBURGH**
**Oliver Bldg.**

**MONTREAL**
**Transportation Bldg.**

UTILITY
FRICTION TAPE
UNITED STATES RUBBER COMPANY
US
RUBBER SYSTEM
AND ASSOCIATED COMPANIES
United States Rubber Company
Mechanical Goods Division

Utility Friction Tape is recommended for use wherever a thin tape is desired. It is coated on both sides with a black compound. Durable for either outside or inside work, or for telephone work.

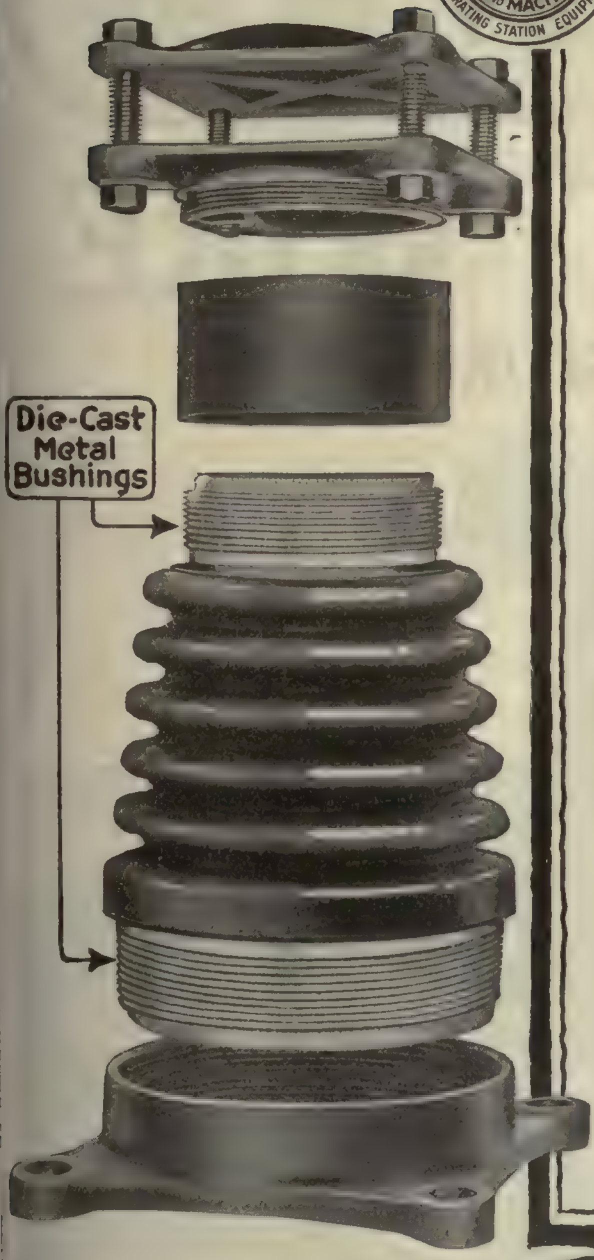
Usco Splicing Compound is elastic, semi-vulcanized, and adhesive, and possesses high insulating resistance. Usco forms a waterproof joint and is suitable for outside or inside work.

*"A Tape for Every Trade and Purpose."*

**United States Rubber Company**

UscO
SPLICING COMPOUND
UNITED STATES RUBBER COMPANY
US
RUBBER SYSTEM
AND ASSOCIATED COMPANIES
United States Rubber Company
Mechanical Goods Division

INSTALL THE "FRANKLIN" AND FORGET IT!
ELECTRICAL DEVELOPMENT AND MACHINE CO.
TRADE MARK
GENERATING STATION EQUIPMENT



## Die-Cast Metal Bushings Do Away With Clamps

Clamped fittings, because of irregularities in themselves or in the porcelain, may exert excessive spot-pressure upon your insulators. Cemented fittings work loose under continuous vibration or may crack the porcelain by reason of the cement's shrinkage.

In "FRANKLIN" Post Type Insulators, such fittings are eliminated. "FRANKLIN" construction provides metal bushings which are moulded to the porcelain.

The intimate contact of these bushings with every point of the porcelain's circumference brings about an even distribution of strains. Thus the carrying capacity of the Insulators is multiplied, and the likelihood of break-down reduced to the minimum.

Freedom from flash-over points and a general structural superiority, which is apparent in every detail, also recommend "FRANKLIN" Post Type Insulators to your consideration.

Other "FRANKLIN" Specialties for Generating Stations are Disconnecting Switches, Potheads, Doors for Bus and Switch Compartments, Instrument Cutout Switches, Cleat Type Insulators, Air Pressure Relays, and the new "FRANKLIN" Fuse. Write for descriptive Bulletins.

# "FRANKLIN"

## BUS BAR SUPPORTS

SELLING AGENTS:
**THE PHILADELPHIA ELECTRIC COMPANY SUPPLY DEPT.**
**132 South Eleventh Street**
**Philadelphia**

DELTABESTON

MAGNET WIRE

HEAT AND MOISTURE PROOF

for windings of
Motors
Lifting Magnets
Portable Drills
Headlights, etc.

Trouble caused by burnouts of windings in apparatus subjected to high temperatures is entirely overcome by the use of "Deltabeston"—the all-asbestos insulated magnet wire.

"Deltabeston" is the ideal magnet wire, the asbestos insulation is no more bulky than silk or cotton and it is not affected by heat or moisture.

The insulation is so flexible that short bends can be made without injuring it and heating of the wire that would destroy silk or cotton covering has no effect on "Deltabeston."

The added advantages of flat or square magnet wires in a variety of sizes enable us to fill your needs.

*Details on request.*

"DELTABESTON" PREVENTS BURNOUTS
Made in Flat, Square, or Round Shapes in all sizes

D & W Fuse Company
Providence R.I.

REG. U.S. PAT. OFF.

# STOCO "CELOGLAS"

**SHATTER-PROOF LENS**

# SAFETY GOGGLES

ADEQUATE eye protection not only preserves eyesight under hazardous conditions but also makes your men better workmen. The man who is constantly dodging, or fearing eye injury, is not a competent workman.

Stoco safety goggles with Celoglas shatter-proof lenses are the best possible eye protection. The frame itself is light weight and comfortable but very strong Celoglas lenses, even when fractured, will not leave the frame or pieces fly into the eyes of the wearer.

Made with elastic headbands as illustrated or with easy cable ear-bows at the same price.

Stoco safety goggles with Celoglas lenses, $115 per hundred pairs.

With regular heavy weight optical glass lenses, $90.00 per hundred pairs.

You are invited to test the Stoco goggle without expense or obligation. A sample will be sent free on request to any Superintendent, Safety Engineer or Purchasing Agent.

## STANDARD OPTICAL CO.

## GENEVA, N.Y.

# Here is the New Columbia Foundry

## Anything in the Line of Castings

GREY Iron, Semi-Steel—Bronze Composition. We will make any casting you desire—and make it *well*. Whether it's a 6000-lb. cast-iron base plate for a machine tool or the smallest detail that can be poured, you are assured of a high-grade product. Columbia foundry facilities are now equal to any demand.

## Columbia Machine Works & Malleable Iron Co

Atlantic Ave. and Chestnut St.

Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Corp., Ltd., Toronto, Ont.

**TOOLS**

- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

**CAR EQUIPMENT**

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iro
- Grid resistors
- Third-rail shoe beams and accessorie
- Trolley poles (steel) and wheels

**The Cleveland Ry. Company Knows Toledo Worth**

This Company knows that an *efficient, dependable* Crane cuts handling costs to the lowest figure.

We said "*an efficient, dependable*" Crane.

That is why the Cleveland Railway Company said "Toledo."

**THE TOLEDO BRIDGE & CRANE CO.**
**Toledo, Ohio**

New York Office, 52 Broadway
Philadelphia Office, 2013 Market St.
Pittsburgh Office, 203 Oliver Bldg.
Cleveland Office, 725 Citizens Bldg.
Chicago Office, 549 Washington Blvd.
San Francisco Office, Rialto Bldg.
Buffalo, 610 Iroquois Bldg.

## Both Advertiser and Reader Must Be Satisfied

Naturally you are interested ***not only*** in the INCOME from your car card space ***but also*** in the STABILITY of that income. It is because COLLIER SERVICE concerns itself so thoroughly with satisfying its clients that the railway company is assured a permanent income uninfluenced by fluctuating business conditions.

Barron G. Collier
INCORPORATED

**Candler Building**
**220 West 42nd Street, New York City**

# As Comfortable at the End of the Ride as at the Beginning

with

# Hale & Kilburn Seats

The shaping of the rattan-covered cushion and back permit a comfortable posture. Two passengers can share a cross seat, have plenty of seat room, and be just as comfortable at the end of a long ride as they are when the ride begins.

Hale & Kilburn seats give the car greater carrying capacity, too, because the offset end parts increase the width of the aisle. This feature and the Hale & Kilburn Corner Grip Handle provide comfort and ease for the passengers who must stand.

Let us tell you about the Hale & Kilburn seat for your cars. We make seats for every kind of service—in wood, rattan, plush or leather. All built for comfort and long service. Hale & Kilburn Seats are widely used in the United States and Europe.

HK WALKOVER
COPYRIGHTED

## Hale & Kilburn Corp.

Philadelphia
New York
Chicago

Washington
Atlanta
Louisville

St. Louis
Detroit
San Francisco

HK WALKOVER
COPYRIGHTED

# Is Merchandise Properly *SOLD* To You?

YOU recognize the direct connection between production methods and the cost and quality of the goods; you have a right to know that goods are properly made. Yet the manufacturing, important though it is, is but the first lap on the journey to the consumer. Merchandise must be sold; sales cost is just as legitimate as manufacturing cost, and it has *just as direct a bearing upon the final cost to you.* If needless expense is incurred, it means either higher prices or a decrease in quality or service.

Obviously it will pay you to recognize efficient selling service. With this simple truth clearly in mind, permit us to enunciate an established, proven sales principle—

### LIST OF MEMBERS

*Each has subscribed to and is maintaining the highest standards of practice in its editorial and advertising service*

Advertising and Selling.
American Architect
American Blacksmith
American Exporter
American Funeral Director
American Hatter
American Machinist
American Paint Journal
American Paint and Oil Dealer
American Printer
American School Board Journal
Architectural Record
Automobile Dealer and Repairer
Automotive Industries

Boot and Shoe Recorder
Brick and Clay Record
Buildings and Buildings Management
Bulletin of Pharmacy

Canadian Grocer
Canadian Railway and Marine World
Candy and Ice Cream
Chemical and Metallurgical Engineering
Clothier and Furnisher
Coal Age
Coal Trade Journal
Concrete
Cotton

Daily Iron Trade & Metal Market Report
Domestic Engineering
Dry Goods Economist
Drygoodsman
Dry Goods Reporter

**Electric Railway Journal**
Electrical Merchandising
Electrical Record
Electrical Review
Electrical World
Embalmer's Monthly
Engineering World
Engineering and Mining Journal
Engineering News-Record

Factory
Farm Machinery—Farm Power
Foundry (The)
Furniture Manufacturer and Artisan
Furniture Merchants' Trade Journal

Gas Age
Gas Record
Grand Rapids Furniture Record

**The seller who advertises in the Business Papers reaching ONLY the class interested in his message, is using the most direct and economical method of helping you maintain an intelligent contact with your sources of supply.**

This kind of advertising bears the same relation to the sales department that an improved machine does to the production department. And if the sales methods are wasteless and efficient you seldom need worry about the goods. Each acts as a support and stimulus for the other.

On the other hand, the practice of buying circulation by the million in the hope of influencing a few thousand possible customers, is open to question. The best machine is a source of waste when improperly used, and this is no reflection on the machine. Concentration beats scatteration, and costs less. The right tool in the right place is a principle of as much importance to selling as to production.

There are many other reasons why discriminating buyers are giving preferred consideration to the concerns which tell them their business story in the buyer's own business paper, *especially* if that paper has subscribed to the high standards of practice of The Associated Business Papers, Inc.

### LIST OF MEMBERS

*(Continued)*

Haberdasher
Hardware Age
Heating and Ventilating Magazine
Hide and Leather
Hotel Monthly

Illustrated Milliner
Implement and Tractor Age
Industrial Arts Magazine
Inland Printer
Iron Age
Iron Trade Review

Lumber Trade Journal
Lumber World Review

Manufacturers' Record
Manufacturing Jeweler
Marine Engineering
Marine Review
Metal Worker, Plumber and Steam Fitter
Mining and Scientific Press
Modern Hospital
Motor Age
Motorcycle and Bicycle Illustrated
Motor World.

National Builder
National Druggist
National Petroleum News
Nautical Gazette
Northwestern Druggist

Power
Power Boating
Power Plant Engineering
Price Current—Grain Reporter

Railway Age
Railway Electrical Engineer
Railway Maintenance Engineer
Railway Mechanical Engineer
Railway Signal Engineer
Retail Lumberman
Rubber Age

Shoe Findings
Shoe and Leather Reporter
Shoe Retailer
Southern Engineer
Southern Hardware and Implement Journal
Sporting Goods Dealer
Starchroom Laundry Journal

Tea and Coffee Trade Journal
Textile World Journal
Timberman
Transfer and Storage

Woodworker

## THE ASSOCIATED BUSINESS PAPERS, INC.

JESSE H. NEAL, EXECUTIVE SECRETARY

HEADQUARTERS: 220 West 42nd Street NEW YORK CITY

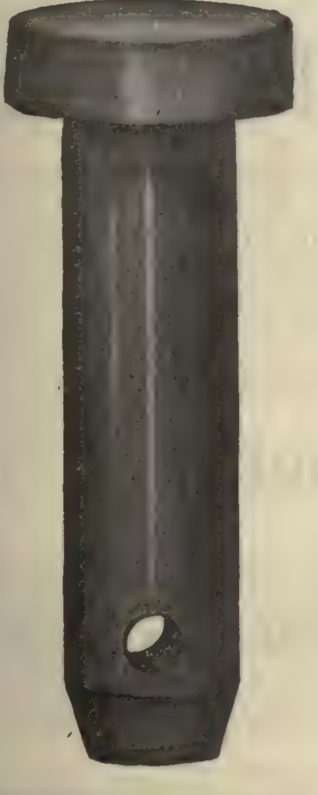
purpose. The lesson of the jitney has been that the public wants frequency and speed in urban transportation. The safety car is the railway's answer to the public's question: "What can you do to save our time in getting around town?" This answer means that the company must have plenty of cars and must move them as rapidly as traffic conditions will permit.

# Safety Cars fulfill their functions—

*When they have*

# BOYERIZED

## Pins and Bushings



The public, if it is going to pay you more money, wants more frequency and more speed—both of which can become impossible of attainment if your brake rigging is faulty. The breakdown of one car can confuse the whole system.

See that your pins and bushings are Boyerized—that is to say, CASE-HARDENED in a way that defies wear.

They're good for hundreds of thousands of miles. Their net cost is lower per 1000 car miles than plain, cold-rolled pins.

ELECTRIC RAILWAY SUPPLIES
**Bemis Car Truck Company**
SPRINGFIELD MASS

The Philadelphia Traction Company's
100 New Cars are Equipped with

**Nevasplit Headlinings**

NEVASPLIT is used on the 100 cars ordered through the Emergency Fleet Corporation for operation by the Philadelphia Rapid Transit Co. to the Hog Island Shipyards.

It pays to start right when buying new cars. Replacements are expensive.

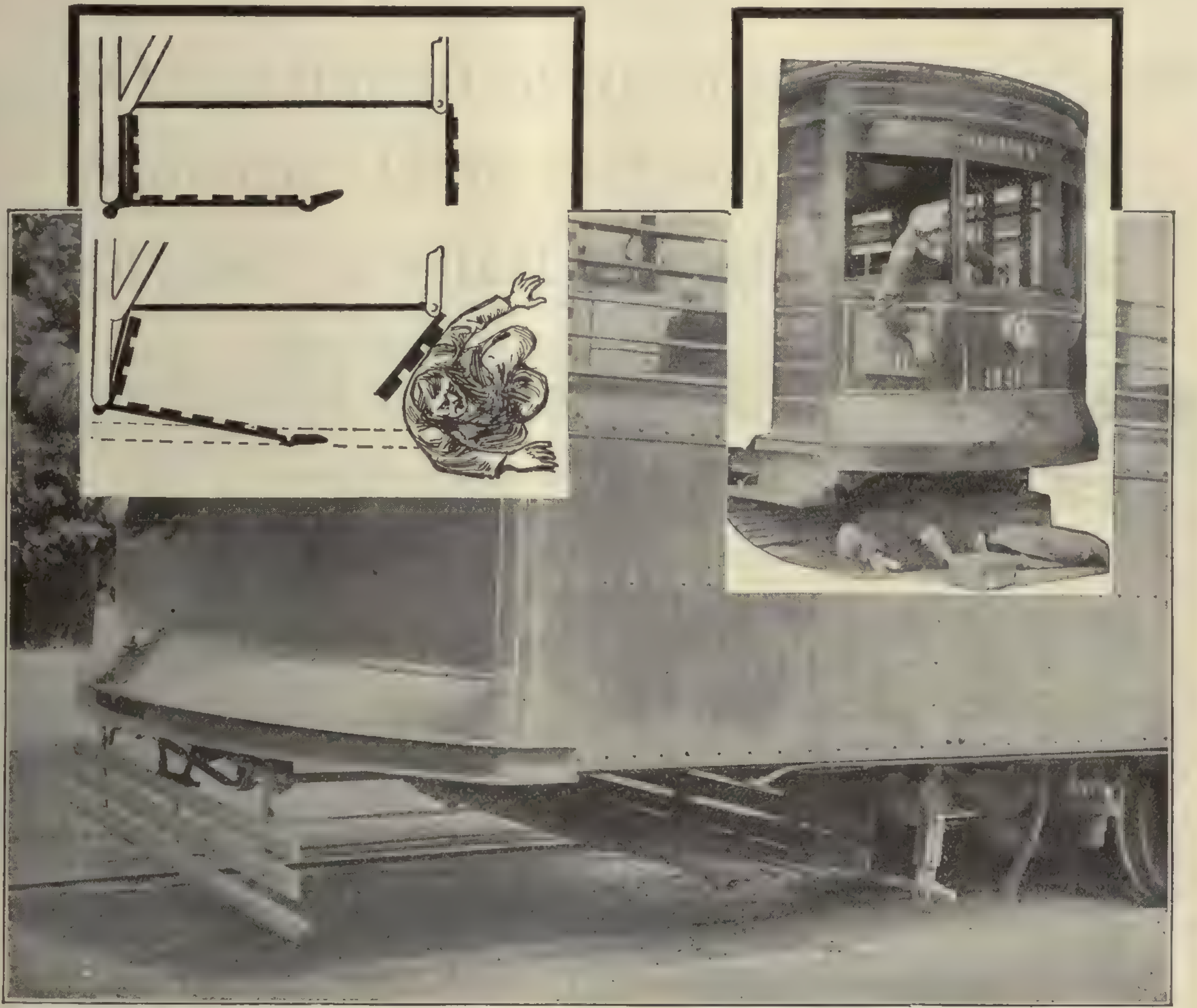
Nevasplit Headlining reduces maintenance costs to the lowest degree. Once put up, it stays up without warping or splitting. It is waterproof, reduces the weight of the car and adds safety and beauty to the car interior.

*Write for booklet and samples of Nevasplit.*

**The Keyes Products Company**
120 Broadway, New York

**W. R. Kerschner Co., Inc.**
50 Church Street, New York

SAN FRANCISCO, Ford & Geirrine, Merchants Exchange Bldg.



*Instantly Picked Up!*

**H-B LIFE GUARDS**

prevent fatal front-end accidents. The pedestrian may fall under the car but the wheels will not touch him.

H-B Life Guards operate *automatically*—that is why they never fail. They can be depended upon to operate *instantly*.

Guard against damage claims. Protect the public and protect yourself—NOW.

**THE CONSOLIDATED CAR FENDER COMPANY**
**PROVIDENCE, R. I.**
General Sales Agent **WENDELL & MACDUFFIE CO.** 61 Broadway, N. Y.

# Study the Comparative Results of Open Hearth and Electric Steel Armature Shafts for Electric Railway Service

**Here they are**

**(Columns showing results obtained in test)**

| Properties | Open Hearth Steel | Electric Steel General Steel Co. |
|---|---|---|
| Ult. Strength, lbs. per sq.in. | 91,200 | 107,700 |
| Elastic Limit, lbs. per sq.in. | 46,000 | 69,950 |
| Elongation in 2 in. | 22.2% | 23.5% |
| Reduction of Area | 44.8% | 50.0% |
| Fracture | Silky, small cup. | Silky; full cup. |
| Elastic—Torsion, lbs. sq.in. | 16,750 | 33,700 |
| Shearing Strength, lbs. sq.in. | 62,400 | 76 |

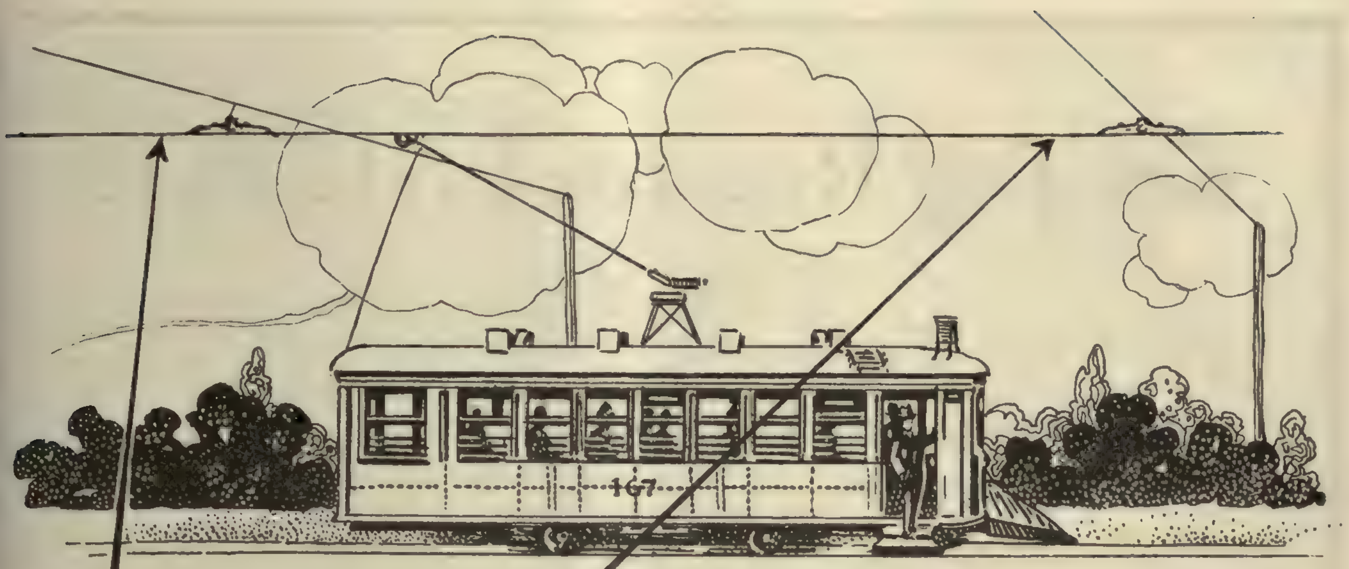
The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a "Pittsburgh" electric furnace. Both were the normal product. Heat treated in each case.

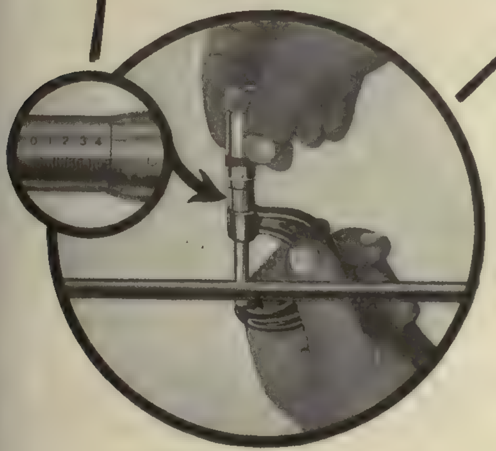
We are equipped to handle the forging of axles and armature shafts from our own manufactured electric furnace steel.

*We Solicit Your Inquiries*

## GENERAL STEEL CO.

Public Service Building, MILWAUKEE, Wis.





Take the Micrometer Measurement Within 10 in. of the Ear

## The Micrometer Test

Will Show Less Wire Wear with

# MILLER TROLLEY SHOES

Than ordinary Trolley Wheel

Install a number of Miller Trolley Shoes on your high speed lines. Measure your wire with a micrometer at points where trolley wire wears most—within ten inches of the ears. After four or more months of Miller Trolley Shoe service *measure the wire* at the same points.

The New Miller Trolley Shoe is the ideal current collector. It eliminates arcing and noise and reduces dewirement to a minimum. Needs no lubricants, delivers more power to the motors, and gives greater mileage. It reduces maintenance cost. Standard on many roads.

You need not take our word for the above statement. Let your line department equip a division and make the test. You will find the wear is less than 1/1000 of an inch, if you can detect any wear at all.

**Miller Trolley Shoe Co.**

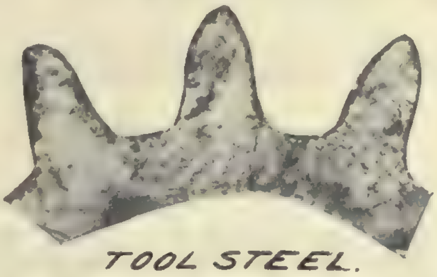
**West Newton, Mass.**

# Keeping Records Up to Date

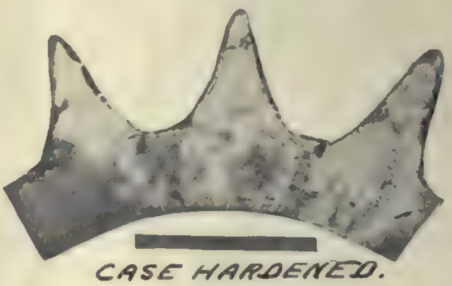
**(A test on an imitation pinion of the 1917 Class.)**

The following shows a record of test on "Tool Steel" vs. a widely advertised pinion hardened by a case-hardening process—claimed to be "as good as Tool Steel"—selling for about the same price.

**"Tool Steel" Pinion on Motor No. 1**



**Imitation Pinion on Motor No. 2**



**Same Car, Same Mileage, both started with new soft gears.**

## Ratio of Wear, 1 to 2.7 Favor "Tool Steel"

**also**

The imitation pinion caused its gear to wear considerably faster than the gear mated with "Tool Steel."

## Have You Made Comparative Tests for Quality?

*If you have, it's dollars to doughnuts you've standardized on our gears.*

**THE TOOL STEEL GEAR AND PINION CO.**
**CINCINNATI, OHIO**

# The Value of the Specialized Product Is Recognized Everywhere

## MORE-JONES
## : ARMATURE :
## BABBITT METAL

is a *specialized product.* Careful study and rigid tests made by expert chemists, metallurgists and the like, have developed a quality metal that cannot be surpassed.

It is hardly necessary to say what a poor bearing metal will do to your revenue by causing frequent renewals and many laid-up cars.

In the manufacture of ordinary babbitts, the conditions of temperature, strain and vibration are seldom given serious consideration. Expert chemistry and knowledge of metallurgy are essential to overcome these difficulties.

The metal used must be of the best quality and its treatment exactly correct.

More-Jones Armature Babbitt is backed by forty years' experience in alloying metals under laboratory supervision.

It contains no trace of lead. It is exactly worked out for an exact service. It is at least one-third lighter than lead-base babbitts and will go much farther, pound for pound. Remelting over and over again causes no loss of efficiency and very little loss in weight. A majority of the leading electric railways use it. SERVICE has justified their selection.

## More-Jones Brass & Metal Co.

St. Louis, U. S. A.

# COSMIC

## METAL BEARINGS

## Prevent Hot Boxes—Eliminate Babbitting

### If we fail to eliminate your Bearing Troubles, no matter how chronic, we make no charge.

Cosmic Metal bearings for armature, axle or motor are made exceptionally strong and tough, to give long life and a slow, even rate of wear. Under actual working conditions and tests they have proved far more dependable than bearings made of other metals.

They have sufficient strength to carry any load and are easily lubricated. If, through accident or other cause, they should not be properly lubricated, they will continue to run *without injuring the machinery* until attended to.

This is a very important point, because ordinary bearings which are improperly lubricated, or hard to lubricate, will generate intense heat. This rapidly causes the bearing to melt, or to fuse and stick, causing serious and costly damage to machinery.

Bearings made of Cosmic Metal will not stick or grab the shaft or axle, even though lubrication does not reach them. They prevent hot boxes with their resultant accidents, and in the end are a much safer and more economical equipment than any other bearing. Let us send further information.

**COSMIC METAL COMPANY**
**420 Walnut Street, Philadelphia**

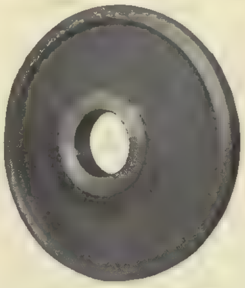
Easy to take off weight.
Takes skill to accumulate muscle.

Same way with Safety Cars.
Cinch to make 'em lighter.
Takes brains to substitute strength
for mere heavy solidity.
We have the brains.
Likewise the Quality Shops,
where you can get the workmanship and materials.

Built the first one-man car years ago.

Let us prescribe for your property.

St. Louis Car Co.
St. Louis, Mo.


Turbine Bucket Wheel

Rough Turned Gear Blank

Street Car Wheel

Automobile Flywheel Blank

Shaft Coupling

Gear Blank

Double Flange Crane Wheel

Industrial Wheel

# CAMBRIA

## CIRCULAR FORGED AND ROLLED SECTIONS

PRACTICALLY any circular or annular section can be made by our combined rolling and hydraulic-forging process providing the weight of each piece is at least 100 pounds and the total number of pieces required is sufficient to warrant the making of the necessary dies.

If you use gear blanks, wheels, turbine discs, flywheel blanks, shaft couplings or any similar sections which are subjected to severe service, it will pay you to investigate and try out our forged and rolled products.

**MIDVALE STEEL AND ORDNANCE COMPANY**
**CAMBRIA STEEL COMPANY**

*General Sales Office,* Widener Building, Philadelphia, Pa.

*District Sales Offices:* Atlanta, Boston, Cincinnati, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Salt Lake City, Seattle, St. Louis.

CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York, is the sole exporter of our commercial products. Address all export inquiries to them.

*"We Want You to Become Better Acquainted With Us" Series. Number 7-I.*

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

***"The 'Standard' Brand on your material is an assurance of eventual economy."***

# STANDARD STEEL WORKS CO.

GENERAL OFFICES:

MORRIS BUILDING, PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA

RICHMOND
SAN FRANCISCO
NEW YORK
MONTEREY, MEX.

MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

It's a Standard—
Sherardized or in Bronze

or can you use an ordinary steel bolt in White's Porcelain Trolley Hanger.

That is just one of the reasons it is *the* economical hanger.

WHITE'S
Porcelain
Trolley Hanger

is easily and quickly hung and aligned on the span wire—another reason it is *the* economical hanger.

Three simple parts—the bolt—the sherardized malleable iron yoke that doesn't rust out—the heavy glazed porcelain insulator that doesn't break when the trolley strikes it—that doesn't deteriorate.

Let us send you a sample hanger—then you can *see why* it is *the* economical hanger for you to use. We will quote you on complete hangers or parts for

*Immediate Delivery*

**T. C. White Electrical Supply Co.**

1122 Pine Street, St. Louis, Mo.

*"Noark" electrical products are manufactured by the Johns-Pratt Co., Hartford, Conn., U. S. A. H. W. Johns-Manville Co., Sole Selling Agents.*

Protects Under All Service Conditions

Every "Noark" Fuse—no exceptions—must pass many severe laboratory tests—before it is offered to meet your severest fuse requirements.

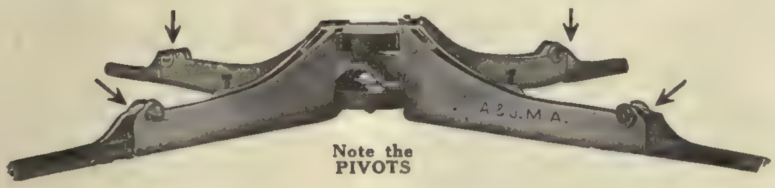
Designed and executed on a scientific laboratory basis, "Noark" Fuses have a definite and certain time interval of operation, varying from a few seconds on heavy overloads to the infinitesimal part of a second on a dead short circuit. When you buy a fuse with the "Noark" label on it, you buy a fuse whose performance is known beforehand—a fuse that can always be depended upon to protect your equipment.

H. W. JOHNS-MANVILLE CO.
New York City
*10 Factories—Branches in 63 Large Cities*

Johns Manville Service
Covers the Continent
And also through—
Asbestos
and its allied products
JOHNS-MANVILLE
Serves in
Conservation
Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS-MANVILLE

# To Eliminate Wire and Wheel Troubles



Note the PIVOTS

# ANDERSON CROSS-OVER

Prevents wheel blows, so common at crossings and so destructive to both the wire and the wheel.

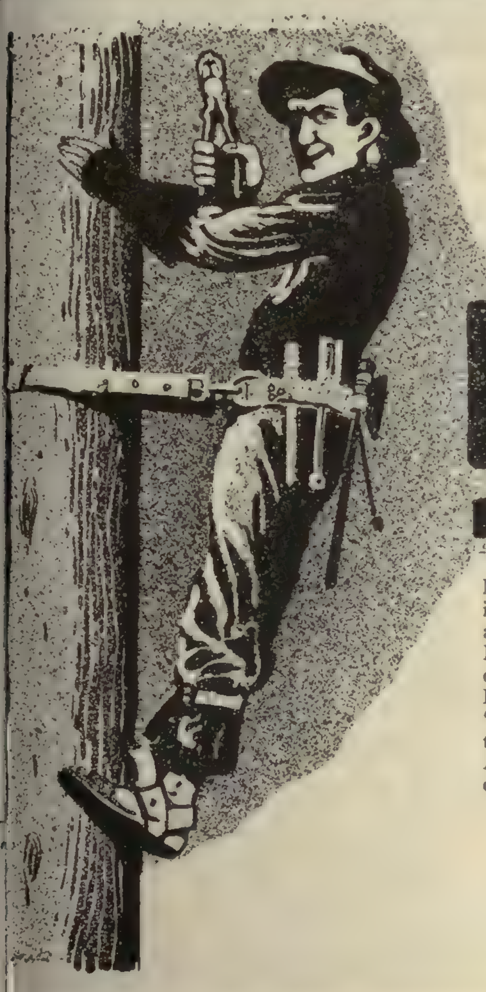
The Anderson Cross-Over is pivoted at all points. Wire breakage and crystallization are impossible.

Install Anderson Cross-Overs on *your* lines and profit by their money-saving qualities. Let us tell you more about them and the Anderson line of harps, bases, trolley wheels, lightning arresters, sanding equipment, frogs, ears, splicers, strains, etc. *Write.*

**Albert & J. M. Anderson Mfg. Co.**

**289-293 A Street** (Established 1877) **Boston, Mass., U. S. A.**

**BRANCHES:**
New York, 135 Broadway.
Chicago, 105 So. Dearborn Street.
Philadelphia, 429 Real Estate Trust Bldg.
London, E. C., 48 Milton St.



# 10,000 Volt

# RIMCO

## RUBBER INSULATED PLIERS

Men have been killed by cutting lines *supposed* to be "dead." Don't take a chance—insist on your linemen using "RIMCO" pliers on high tension work, and KNOW they are safe-guarded.

Every pair of "RIMCO" pliers is insulated with the best grade of Para rubber obtainable, every pair is tested at 10,000 Volts and tagged with a certificate of the Electrical Testing Laboratories, Inc.

"RIMCOS" are unbreakable and every pair is evenly tempered, will not chip and the rubber insulation will not loosen or come off.

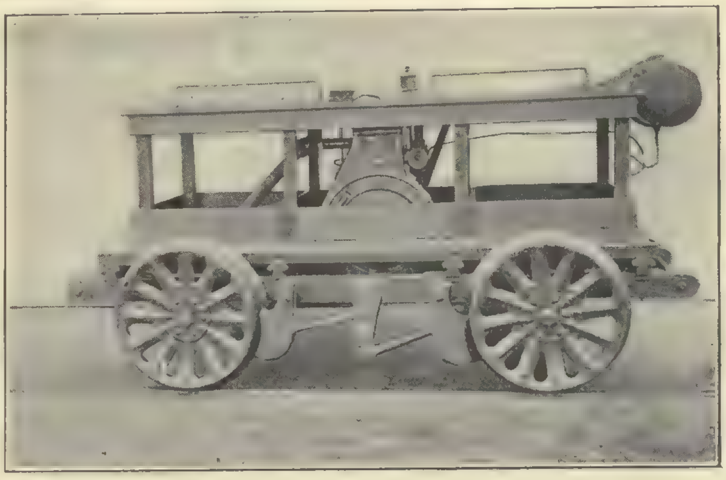
A strictly high-grade tool at a price lower than many *uninsulated* pliers—you get quality and protection—service and satisfaction.

**RUBBER INSULATED METALS CORP.**
**Plainfield, New Jersey**

SALES AGENTS: Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia.
Canadian Agent: Lyman Tube & Supply Co., Ltd., Montreal, Toronto and Winnipeg.

*Exclusive Export Agents*
*International*

***Western Electric Company***
INCORPORATED



## The Detroit United Ry. Is Getting Better Results From Employees With Motor Section Cars.

Instead of reaching the job fagged out and ready for a rest, they arrive full of "pep" after an exhilarating ride in the cool, fresh air. Each car is equipped with

**THE "New-Way" ENGINE**
**GOES AND GOES RIGHT**

—one-cylinder, 4-horsepower, 4-cycle engine with clutch control and one-way one-speed operation.

Motor section cars, equipped with New-Way Motors, help solve the labor problem because in the last few years it has been almost impossible to get section men to pump the old style hand car.

The Detroit Company found that the energy of the men saved for more necessary and profitable work would more than pay for the cars in a short period. That is why they are going to use more from time to time as necessary

*Write for particulars.*

**THE "New-Way" MOTOR COMPANY**
**LANSING, MICHIGAN, U.S.A.**

# WEISS SWITCH LOCK

## No More Split Switches

A safety necessity for street and interurban railways. Locks both right and left—no *chance* of a split switch—few parts—safe, dependable, simple in construction and easily installed. Fits any rail section. Used by many prominent roads. Send us a trial order and put them to the test.

*Watertight*
*Non-Freezable*
*Mud-Proof*
*Sand-Proof*

**Simple and Indestructible**

This switch lock is exceedingly simple in design, having very few parts, none of which is complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through to prevent the entrance of water or dirt.

The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

**You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.**

**WEISS SWITCH LOCK CO., 600 E. Capitol Ave., Springfield, Ill.**

# NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

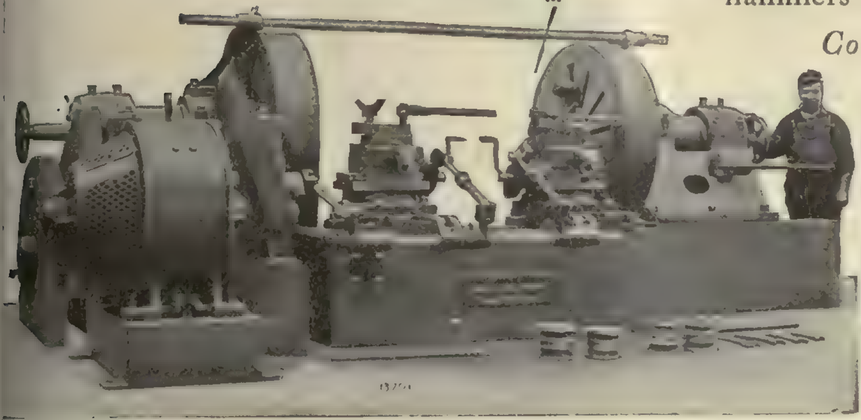
## MACHINE TOOLS

For Electric Railway Repair Shops

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including steam hammers and electric traveling cranes.

*Correspondence Invited.*

Standard Car Wheel Lathe



*Our Line Includes*

**Axle Lathes, Car Wheel Borers, Hydraulic Wheel Presses, Shapers, Planers, Drills, Slotters, Bolt Cutters, Milling Machines, etc.**

## Why Waste Money and Time

fitting ordinary fingers on controllers, and loading the scrap barrel?

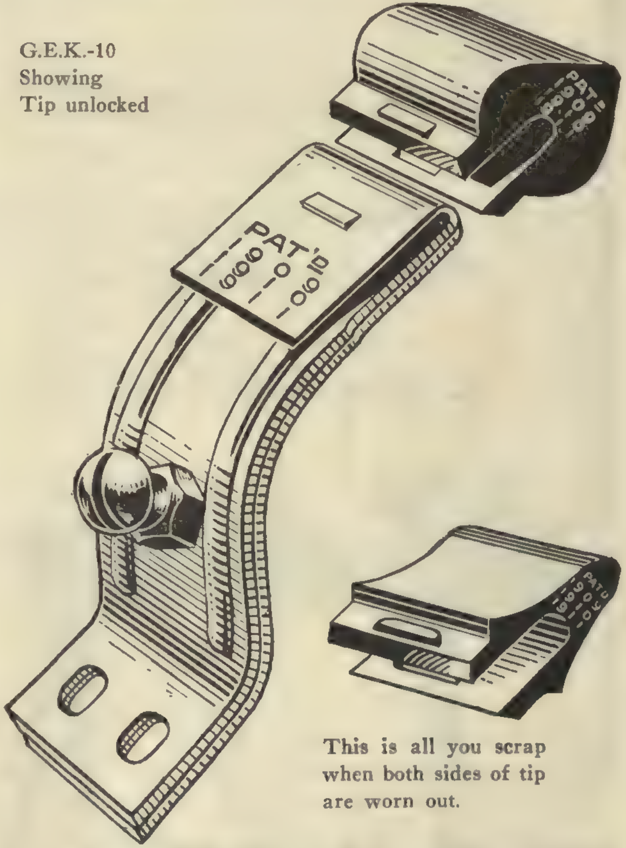
Use Triggerlock Reversible Controller Fingers, which wear for years and stay adjusted on your controllers. Only the tip has to be replaced when worn out on both sides, and each tip will outwear four common fingers, and then you scrap only one ounce of copper.

The tips, which are interchangeable, fit all types of controllers and with a few extra fingers on hand to replace any that meet with accident, all the stock you require is a box of tips.

That is why hundreds of electric railways have standardized them. They are guaranteed. We make only Triggerlock Controller Fingers and have perfected them in every way, and they will give you the most satisfactory service.

Specify them when ordering fingers.

G.E.K.-10
Showing
Tip unlocked



This is all you scrap when both sides of tip are worn out.

# TRIGGERLOCK REVERSIBLE CONTROLLER FINGER

814 Bath Ave., Niagara Falls, N. Y.

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# Don't Lose Time on Lathe Jobs

The *New* 11-inch "STAR" Quick Change Lathe—with 45 changes of feed and threads—can help you.

It's accurate, sturdy, compact—has every improvement and all attachments—and is the ideal Lathe for light work in the car shop.

*Our circular will interest you.*

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**The
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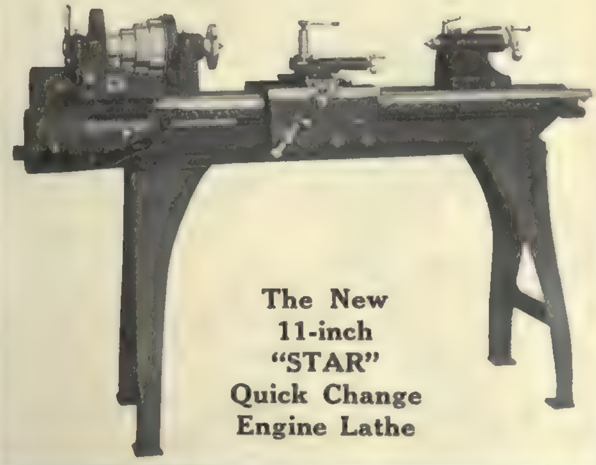

**The New
11-inch
"STAR"
Quick Change
Engine Lathe**

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CONSIDER these excelling points of Bayonet Equipment: perfect traction; greater flexibility to pole action; uniform wire pressure at any angle of pole; no bent trolley poles.

# The Line for Your Line

Long service and low maintenance are the things you considered most when you bought your overhead equipment. But if you are not using

## Bayonet Trolley Equipment

it is because Bayonet products were not brought to your attention.

Bayonet Harps, Wheels and Bases have demonstrated, thru competitive tests, their superiority for service, convenience and economy.

Bayonet Equipment keeps your cars moving on schedule time and reduces power costs.

*Our catalog will complete the story*

**Bayonet Trolley Harp Co.**

**Springfield, Ohio**

# Controller Contact Fingers

are made of hard-drawn or drop forged copper, while the springs are stamped from special alloyed rolled phosphor bronze sheet. Standard parts are shipped from stock; special sizes or shapes made to order.

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North East, Pa.

**The Eureka Co.**

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For Air Brakes

**Poppet Type—No Ground Joints**
**Minimum Maintenance Expense**

Graduated application positively secured at service point.
Quick emergency application with *full open ports* at emergency point.
Graduated release if desired.
*Very Quick* release at full release point.
No ground joints—cost of maintenance greatly reduced.

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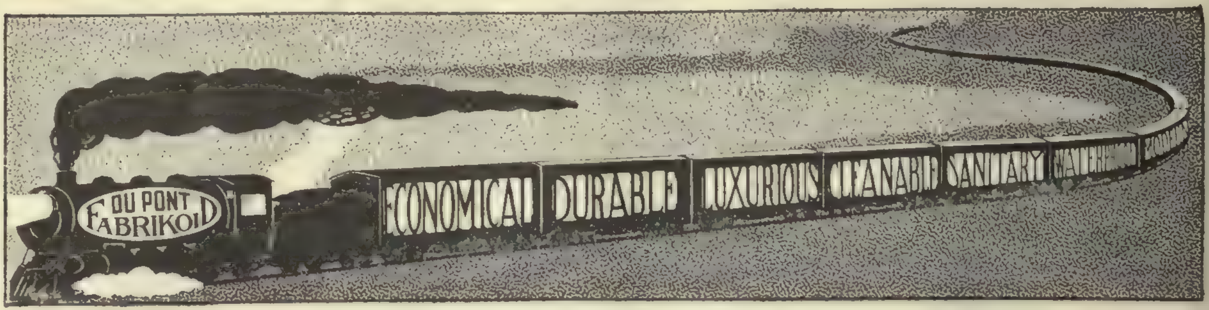

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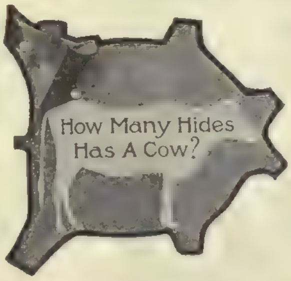
Du Pont Fabrikoid gives lasting service—perfect cleanliness—enduring beauty. It is the modern, sensible covering for cushions in passenger coaches, cabs and cabooses. Designed to be better than leather and plush, it happens to be cheaper also. Many roads have taken advantage of this. Do you wish samples?


How Many Hides Has A Cow?

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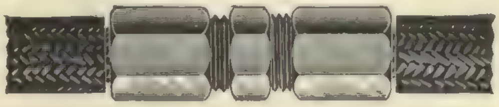
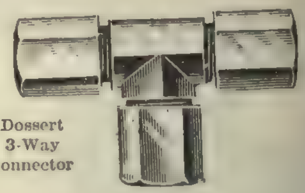


Dossert 2-Way Connector

Dossert Y Connector



Dossert 3-Way Connector

Simple—Safe
Economical and Reliable
DOSSERT SOLDERLESS
Connectors and Terminals

Three DOSSERT leads are used in this junction box of the Interborough Rapid Transit Co., 74th Street Station, New York City, forming part of a 600 volt auxiliary line.
Power houses of the leading railways use Dossert Solderless Connectors in large quantities from small wire connections to the jointing of the heaviest conductors.
The exclusive Dossert tapered sleeve gives large contact area held permanently tight.
The simplest, safest and best low cost connection for every type of wire and cable.

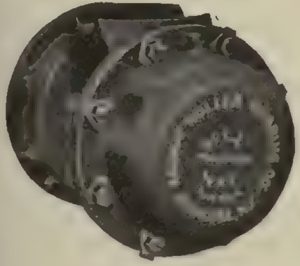
*Write for the Dossert Catalog.*

DOSSERT & COMPANY
H. B. LOGAN, President—242 West 41st Street, New York

*Take off one car—and still get the same car mileage!—*

*with*

ROLLWAY BEARINGS



A railway compared two 26-ton, four-motor cars, one with plain bearings and one with Rollway Bearings, over a 12.7 mile line with the same motorman and under the same physical conditions.

The Rollway Bearings car not only used 10.15 per cent. less energy, but it made the run in 55 instead of 61 minutes.

This saving of 9 per cent. in running time is almost the equivalent of 9 cars for 10 for the same car mileage!

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**Central Electric Railway Association Mid-Summer Meeting and Cruise on Steamer South American**

**Four Days June Thirtieth to July Third Inclusive**

**Toledo via Detroit Georgian Bay, Mackinac and Harbor Springs to Benton Harbor and Chicago**

**Things Worth Noting**

The South American, specially chartered for this cruise, is the finest exclusively passenger cruising steamer on the Great Lakes.

Has a fine ball room on an upper deck.

Has a children's play room entirely enclosed with netting on an outer deck and carries a children's entertainer.

Carries for this cruise a special orchestra of six pieces.

Has a large dining saloon that seats 280 at one time.

**ITINERARY**

Leave Toledo at 9 o'clock a. m., central standard time, Monday, June 30, 1919.
Reach Detroit Monday, June 30, 1919, at 2 p. m.
Leave Detroit, Monday, June 30, 1919, at 3 o'clock p. m.
Arrive Perry Sound, Georgian Bay Tuesday, noon, July 1st.
Leave Perry Sound Tuesday, July 1st, 2 o'clock p. m.
Arrive Owen Sound Tuesday, July 1st, 6 p. m.
Leave Owen Sound Tuesday, July 1st, 8 p. m.
Arrive Mackinac Island, Wednesday, July 2d, 7 a. m.
Leave Mackinac Island Wednesday, July 2d, 9 a. m.
Arrive Harbor Springs Wednesday, July 2d, 2 p. m.
Leave Harbor Springs Wednesday, July 2d, 4 p. m.
Arrive Benton Harbor Thursday, July 3rd, 10 a. m.
Leave Benton Harbor Thursday, July 3rd, 10:30 a. m.
Arrive Chicago, Thursday, July 3rd, 4 p. m.

Tickets, including meals and berth, Toledo or Detroit to Benton Harbor or Chicago, for the four days cruise, $26.50 each, including War Tax. Children between 5 and 12 years of age, half fare.

Railway officials send applications and remittances for stateroom reservations direct to

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when your road is protected by

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No matter what your road conditions are, a Nachod will take care of them. There are 7 types of Nachods for all service, from high speed interurban to city travel.

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*Nachod Spells Safety*

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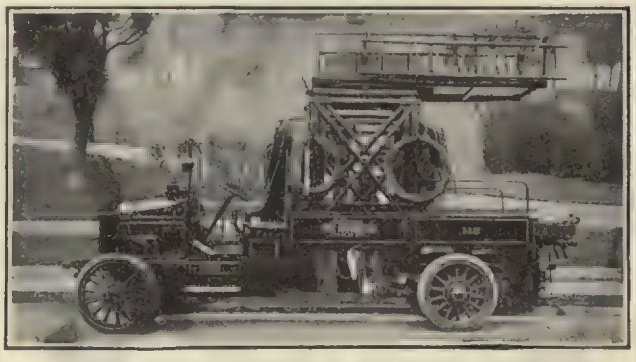

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is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

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A trestle of an electric railway in Maine which was replaced by a 72-inch "ACME" (Nestable) Culvert, thus permanently eliminating an expensive item of maintenance.

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"ACME" Culverts because of their sectional nature can be used in places where large diameter full circle Culverts would be out of the question.

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WE MAKE THIS GRADE ONLY

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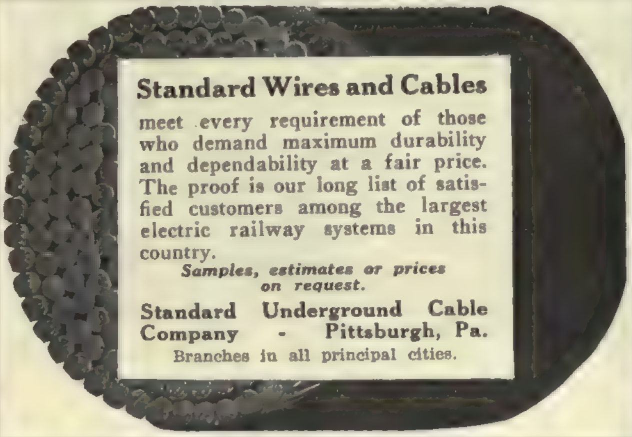

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meet every requirement of those who demand maximum durability and dependability at a fair price. The proof is our long list of satisfied customers among the largest electric railway systems in this country.

*Samples, estimates or prices on request.*

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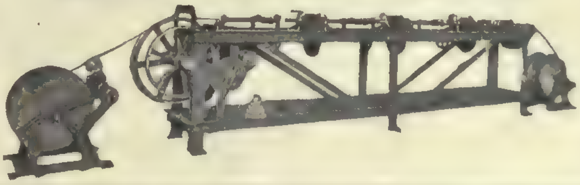

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saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems. Full details in our catalog. Write for it.

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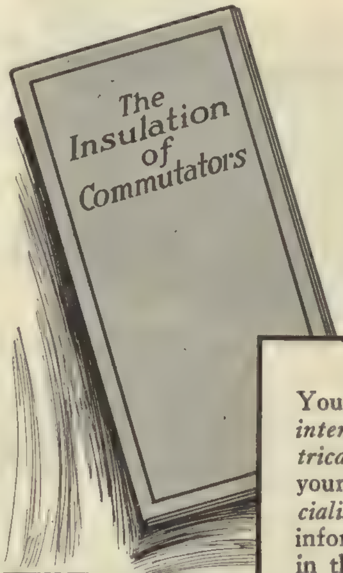

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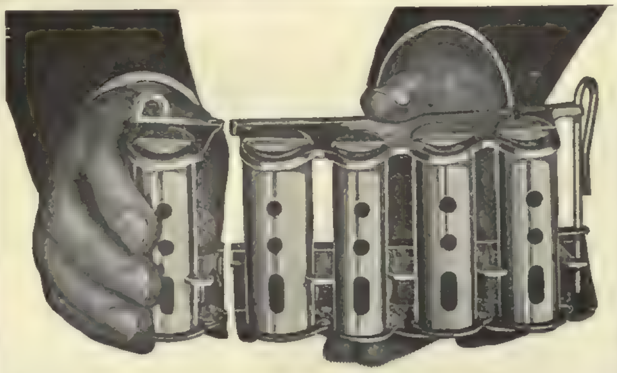
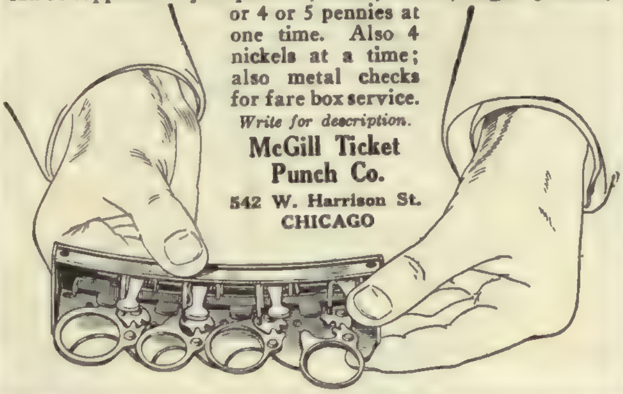


**A Great Improvement in Coin Changers**

The McGill HIGH-SPEED Lever-operated Changer is now built with a gear movement instead of a curved cam. If desired a fifth barrel can be attached, which will meet all practical requirements of fare collections. The new machine can be supplied to eject quarters, dimes, nickels, single pennies, or 4 or 5 pennies at one time. Also 4 nickels at a time; also metal checks for fare box service.

*Write for description.*

**McGill Ticket Punch Co.**
542 W. Harrison St.
CHICAGO



**International Fare Registers**

International Coin Registers; Coin and Transfer Registers; Coin, Metal Ticket and Transfer Registers, both hand and motor driven, for cars, stations, ferries, park or terminal use. Single and double fare registers.

EXCLUSIVE AGENTS FOR HEEREN ENAMEL BADGES

**The International Register Company**
15 South Throop Street, Chicago

SERVICE
SAFETY
*and*
ACCURACY

Insured through use of "KANT-SLIP" Interurban Train Dispatcher Register Systems

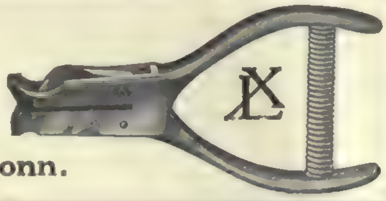
The
**STANDARD REGISTER COMPANY**
DAYTON, OHIO

*Write for booklet*

THE
**CLEVELAND**
Is the practical Fare Box for
**Service at Cost**
Let us tell you why

**The Cleveland Fare Box Co.**
Cleveland, Ohio.
Canadian Branch: Preston, Ont.

**EXELL MFG. CO.**
New Haven, Conn.



**Car Heating and Ventilation**

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

PS HEATERS

**The Peter Smith Heater Company**
1725 Mt. Elliott Ave., Detroit, Mich.

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**"Everything in Insulation"**

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| Mica | Waxes |
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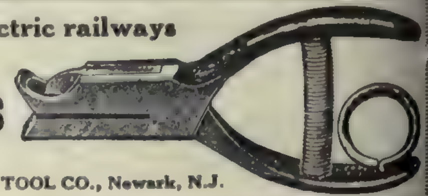
| Insulating Tapes | Insulating Varnish |

The above are only a few of our products
Write us for anything in this line you may require.

**MITCHELL-RAND M'F'G CO.**
103 John St., New York City

75% of the electric railways use
**B-V Punches**
*Send for Catalog.*
BONNEY-VEHSLAGE TOOL CO., Newark, N.J.



This man

received an increase of 30 per cent in his salary

—because he had the business judgment to announce this want in the Searchlight of Electric Railway Journal.

POSITION wanted by young man with 7 years' experience as armature winder and controller man. Best of references. Box Elec. Ry. Jour.

He writes:

"The result from my advertisement in the Electric Railway Journal was wonderful. I received 8 replies and accepted a new position with more than 30 per cent increase in salary."

His Ad. ran four times at a cost of $2
Was it worth it?

*Put your Wants in the Searchlight*

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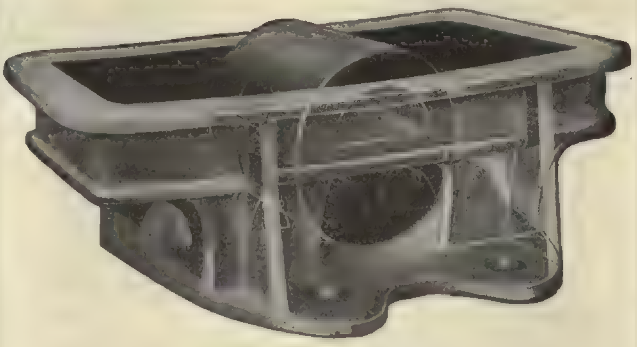

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SIDE BEARINGS

have neither springs nor axles nor levers nor other delicate parts.

Simply a cage and one roller made of Tropenas steel. Roller is eccentrically loaded.

**A. STUCKI CO.**
**Oliver Building, Pittsburgh, Pa.**

32,680 MILES

was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

U S G Brushes

are especially designed for the service in which they are to operate.

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**Saginaw, Michigan, U. S. A.**
**Branch Offices:** New York, Pittsburgh, Philadelphia, Atlanta, Chicago, St. Louis, Denver, San Francisco.

The Kalamazoo Trolley Wheels.

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

**THE STAR BRASS WORKS**
**KALAMAZOO, MICH., U. S. A.**

BRAKE SHOE STANDARDS

SAVE MATERIAL
SAVE LABOR
SAVE TIME
SAVE MONEY

*Ask Us?*

**American Brake Shoe & Foundry Co.**
**30 Church Street, New York**
**332 S. Michigan Ave., Chicago**
**Chattanooga, Tenn.**

**"Zero"**
for
Axle and
Journal
Bearings

AND

**"Motor"**
for
Armature
Bearings

## STANDARD for a THIRD of a CENTURY

### The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

*Write us for details.*

**E. L. Post & Co., Inc., Sole Mfrs., 50 Cliff St., New York City**

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## Ajax Perfecto Bronze Check Plates

Made from our Perfecto Bronze — the strongest and toughest metal on the market; will bend before it will break. Withstands shocks therefore, and outlasts all other check plates several times.

*Specify Ajax Perfecto Bronze on your next requisition.*

**The Ajax Metal Company**
*Established 1880*
*Main Office and Works:* **Philadelphia, Pa.**
*Southern Plant:* **Birmingham, Ala.**

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**Steel for Service**

This company makes

## Rolled Steel Wheels

which range in size from those for light industrial cars to the largest electric railway type.

They are the result of long years of experience on the part of men who excel in the art of rolling steel.

**Carnegie Steel Company**
General Offices: Carnegie Building, Pittsburgh, Pa.
1146

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## Trolley Wheels

### Forty-Four different types

Made of high-grade bronze—perfectly machined—at a price you cannot afford to overlook.

Your type is among the forty-four—or we'll make it especially for you.

*What Wheel do you desire a price on?*

**The Holland Trolley Supply Co.**
**Cleveland, Ohio**

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The result of the best practice in electric railway work is recorded every week in the Electric Railway Journal.

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**Use them in your terminals—**
**PEREY TURNSTILES**
**or PASSIMETERS**
*Faster than the ticket seller*

**Perey Manufacturing Co., Inc.**
30 Church Street, New York City

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## VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

**VAN DORN COUPLER CO.**
2325 So. Paulina St., Chicago, Ill.

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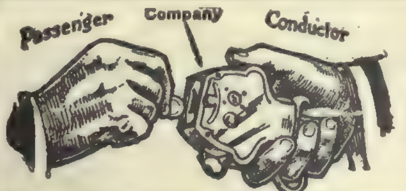

**Direct Automatic Registration**
By the
**Passenger**

**Rooke Automatic Register Co.**
Providence, R. I.

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**UNIVERSAL ANTI-SLIP TREADS**
cars and station steps.

**Universal Safety Tread Company**
Waltham, Mass.

**Le Carbone**
Carbon Brushes are uniform. They talk for themselves.

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227 Fulton Street
New York City

Pittsburgh Office:
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Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
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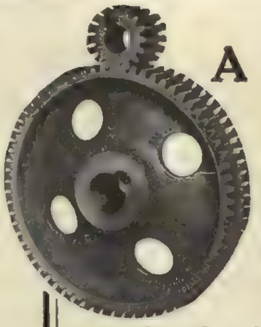

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B. P. gears and pinions are primarily railway service gears. The high quality of their steel structure makes breakage almost impossible. Users will vouch for this.

We have guaranteed all B. P. gears to last four times as long as standard untreated cast steel gears in identical service and in their years of service no replacements have been necessary to make good this guarantee.

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Pittsburgh, Pa.

Nuttall Gears
EVERY GEAR REGISTERED

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Samson Bell and Register Cord

Solid braided cotton, extra quality. All sizes and colors. More durable, more economical and better looking than leather or rawhide. Send for samples and full information.

SAMSON CORDAGE WORKS, BOSTON, MASS.

Smith-Ward
Brake Slack Adjusters

*Promote Braking Safety*

That means that they work practically 100% efficient. That is as near perfect as any mechanical device can be made. When your cars are equipped with Smith-Ward Adjusters there are no "ifs" about their operation. They are "safe" all the time. Hundreds of cars equipped with our adjusters now in daily operation are proofs of that statement.

*Can you say that of any other Adjuster?*

Smith-Ward Brake Co.
Bush Terminal Bldg. No. 1
233 Thirty-Seventh St., Brooklyn, N. Y.

## POSITIONS VACANT

ASSISTANT superintendent of transportation wanted by a large City Property in the Midwest. Must be familiar with schedule making, traffic survey and the details of handling transportation. Write fully all necessary information and salary received. Confidential. P-411, Elec. Ry. Journal, Chicago.

CHIEF engineer wanted for eCntral Power Station, Middle West, 20,000 KW. capacity. Position requires man of experience and organizing ability. Answer stating fully experience and previous results obtained. P-408, Elec. Ry. Journal, Chicago.

COMPETENT car barn man wanted to care for eight small cars, repair overhead lines and with some knowledge of track repair work. State age, experience and salary expected in first letter. P-398, Elec. Ry. Journal, Philadelphia.

DRAFTSMAN wanted, experienced in calculating and designing street railway special track work. State salary and experience. The Buda Co., Harvey, Ill.

MASTER mechanic wanted between the ages of 30 and 40 years, by railway in middle west operating 30 cars. Must have conception of keeping records pertaining to costs and life of material used. P-402, Elec. Ry. Journal, Chicago.

SHOP foreman wanted for small system in Northern Alabama. Young married man with some experience as armature winder and electrician preferred. Excellent opportunity for rapid advancement to ambitious man. State fully age, previous experience and salary expected. P-409, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

## POSITIONS WANTED

ACCOUNTANT; age 30 to 40; energetic, with knowledge of the higher branches of theory and practice; thoroughly conversant wit hstreet railway work particularly, and familiar with the preparation of reports to public authorities. Salary $2700 per annum, with opportunity for advancement. PW-404, Elec. Ry. Journal.

CAR barn foreman wants position; reliable married man; American; strictly temperate; references furnished. PW-410, Elec. Ry. Journal.

ELECTRICAL, mechanical or executive employment suitable for married man with technical knowledge, mechanical skill, business training and refinement. Broad experience as machinist and factory electrician and as steam engineer, electrical engineer, superintendent and manager of electric light and railway properties. Efficiency or research work preferred but any suitable immediate employment considered. Best of references. Address "Industry," Mauch Chunk, Pa.

INSTRUCTION expert, twelve years experience, would like change; possibly I can show your men how to become more efficient, resulting in voluntary coöperation, better relation with the public and the prevention of accidents. PW-400, Elec. Ry. Journal.

POSITION as general freight agent with electric line; have had 15 years' experience as general express and freight agent; can furnish best of references. George Dimford, 59 Marshall St., Rochester, N. Y.

SUPERINTENDENT open for engagement after July 1st; 18 years' experience, working from bottom up, motorman, conductor, motor repair, construction and superintendent of operation. A-1 refere nce. PW-406, Elec. Ry. Journal, Chicago.

SUPERINTENDENT or master mechanic wants position; 15 years' experience on maintenance and construction, all lines and equipments. A handler of men and knows how to do the work himself. A-1 references from similar positions held. PW-405, Elec. Ry. Journal, Philadelphia.

## POSITIONS WANTED.

MANAGER-ENGINEER leaving Government service is seeking responsible executive position with Public Utility Corporation, Engineering Company, or Commercial Company where personal ability, experience and initiative will be recognized. Have had wide business and engineering experience in the Electric Railway Industry and thoroughly skilled in handling public relations and industrial matters. Ability, reputation and character above reproach. Have wide personal acquaintance in electric railwav industry as experienced sales manager. Highest references furnished. Personal interview solicited. PW-407, Elec. Ry. Journal.

ROADMASTER or general foreman, technical education; experienced on city and interurban track maintenance and construction; open for imediate engagement. PW-403, Elec. Ry. Journal.

## FOR SALE

**5-10 Bench Open Cars For Sale** (Bulkhead), with or without equipment. P. O. Box No. 746, Foxboro, Mass.

## WANTED

- 2—K-6 and 2—K-10 G. E. Controllers, in good operating condition.
- 1—Drew Electric Shovel, suitable for gravel bed.
- 1—Second-hand Car Wheel Lathe, in good operating condition, for use with 37-in. Rolled Steel Wheels.
- 1—Storage Tank, for lubricating oil—1000 gal. capacity.
- 1—Set Triplex Falls Yale & Towne make, Model 1898, 1-ton capacity.

## FOR SALE

- 1—Buckeye Electric Blueprinting Machine.
- 10—W. E. & M. Co. Type 250-C Switch Groups, in good operating condition.
- Various Repair Parts (New), G. E. Type M Control.
- 1—L-4 Controller, in good condition.
- 2—L-14 Controllers, in good condition.

**Rochester & Syracuse Railroad Co., Inc.**
Purchasing Agent, Box 51, Syracuse, N. Y.

## NEW RAILS

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| 450 ton 100-lb. | 300 ton 85-lb. A.S.C.E. |
| 300 ton 90-lb. | 250 ton 80-lb. A.S.C.E. |

## SWITCH TURNOUTS

8—70-lb. A.S.C.E., and frog Manganese. New.
1—60-lb. ARA-A 4½ L.H. Good as new.
1000 kegs 9-16 x 5½-in. "Zelnicker Select". Used Spikes.
300 kegs 9-16 x 5½ in. New Spikes.
2000—70-lb. Rail Braces, New.

***Track Accessories all kinds***
***Prompt shipment***

**ZELNICKER IN ST. LOUIS**

*Get Bulletin* 250 (250,000 Circulation)
***A Big Money Saver***

FOR SALE

## 4 Wason Paye Cars

28 ft. over corner posts
Standard O-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

## Cars, Rails, Locomotives, Cranes, Generators, Turbines, Motors, Machine Tools, Hammers, Presses

Everything For
POWER, RAILROADS, INDUSTRY, CONTRACTORS

What do you want to Buy or Sell?
Write for our Bulletin No. 119.

***Our ENGINEERING DEPARTMENT will Design, Construct and Finance your undertakings. Send us particulars.***

**RAILWAY & POWER EQUIPMENT CO.**
Woolworth Bldg., New York, N. Y.
Cable Address: "Johnscar" Code, Western Union.

**Keep your eye on the Searchlight and your advertisements in it.**

FOR SALE

## Complete Power Equipment

Consisting of Boilers, Generators, Rotary Converters, Transformers and Auxiliaries. All electrical apparatus is 25 cycle, in first-class condition, and can be released about July 1st. For further information apply to

**PHILA. & WESTERN RY. CO., Upper Darby Branch, Philadelphia, Pa.**

## WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc **Remember our initials stand for our product.**

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

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## SURPLUS MATERIAL AND EQUIPMENT

All classes of ship construction and Shipyard Plant Construction equipment and material including large quantities of—

Wood Working Machinery
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Electrical Machinery
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Steel Plates, Shapes and Bars
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All parties interested in the purchase of any of the foregoing classes of material will receive formal invitations to bid periodically as the material is available if they will promptly request that their names be placed on mailing lists for the items in which they are interested.

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Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**
***Cars and Trucks, Snow Sweepers, Electric Locomotives***
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## ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
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SECURES
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SITUATIONS
SALES

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## Turbo-Generator Units

### 60 CYCLE

10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

### 25 CYCLE

6500 Kw. Allis-Chalmers Horizontal Turbo Generator Unit, 3-phase, 25-cycle, 6600 volts, 4 pole, 750 RPM. Send for full details and specifications.

***We have these units in stock for immediate shipment. We own them and are not acting as brokers.***

**MACGOVERN & COMPANY, Inc.**
114 Liberty Street, New York, N. Y.
**Pittsburgh Office, 498 Union Arcade Building**

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We own and offer for sale a used McKeen Motor 71-Passenger Car, all steel. In first class condition. Write or wire us for further information.

**HYMAN-MICHAELS CO.**
**People's Gas Building, Chicago**
**Phone: Harrison 1100**

***New and Relaying Rails*** ***BUYERS OF ABANDONED RAILROADS***

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**15,000 TONS—NEW and RELAYERS**
**NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.**
**RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.**

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

**L. B. FOSTER COMPANY**
Park Building, Pittsburgh, Pa.

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Little "WANT" cards
bring big results in
RAILWAY JOURNAL

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### *FOR IMMEDIATE SHIPMENT*

75 tons of 6-in., 62-lb. **Shanghai Relaying Rail,** practically as good as new, with angle bars to match Wire for quotation.

Also all other sections of **Standard Relaying Rail and a lot of Steel Girder and Deck Plate Bridges.**

M. K. FRANK, Frick Bldg., Pittsburgh, Pa.

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## CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

***Get our List and Prices.***

**J. F. DONAHOO CO., Birmingham, Ala.**

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Pressure Relays**
Philadelphia Electric Company Supply Dept.

**Air Rectifiers**
Holden & White, Inc.

**Anchors, Guy**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Ash Storage Tanks, Cast Iron**
Green Engineering Company

**Automobiles and Buses**
Brill Co., The J. G.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Carnegie Steel Co.
General Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
Ajax Metal Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Batteries, Storage**
Electric Storage Battery Co.

**Batteries, Dry**
Johns-Manville Co., H. W.

**Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
Post & Co., Inc., E. L.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
Holden & White, Inc.
Stucko Co., A.

**Bearings, Roller and Ball**
Gurney Ball Bearing Co.
Railway Roller Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.
Reading Specialties Co.
Zelnicker, Walter A., Supply Co., Inc.

**Boiler Covering**
Johns-Manville Co., H. W.

**Boilers**
Babcock & Wilcox Co.

**Boiler Cleaning Compounds**
Johns-Manville Co., H. W.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Lincoln Bonding Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Roller Smith Co.
Westinghouse Elec. & M. Co.

**Bond Pesters**
Lincoln Bonding Co.
Roller Smith Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters**
Holden & White, Inc.
Smith Ward Brake Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
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General Electric Co.
Holden & White, Inc.
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**Bridges and Buildings**
American Bridge Co.
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**Brooms, Track, Steel or Rattan**
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**Brushes, Carbon**
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Morgan Crucible Co.
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**Brushes, Graphite**
United States Graphite Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Buckets**
Blaw-Knox Company

**Bumping Posts**
Mechanical Mfg. Co.

**Bunkers, Coal**
American Bridge Co.

**Bushings, Case Hardened & Manganese**
Bemis Car Truck Co.

**Cables. (See Wires and Cables.)**

**Cable End Bells**
Philadelphia Electric Company Supply Dept.

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Motor Section**
New Way Motor Co.

**Cars, Self-Propelled**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper**
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Electric Service Supplies Co.
Holden & White, Inc.
Kerschner Co., Inc., W. R.
Ohio Brass Co.
Wood Co., Chas. N.

**Change Carriers**
McGill Ticket Punch Co.

**Ceilings, Car**
Keyes Products Co.

**Circuit Breakers**
The Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Matheas
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Clamps, Insulator**
Philadelphia Electric Company Supply Dept.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.

**Cleat Type Switchboard Insulators**
Philadelphia Electric Company Supply Dept.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Rome Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**
International Register Co., The

**Commutator Slotting Files**
Handy Supply Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

**Commutator Stones**
Handy Supply Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

**Concrete Mixers**
Blaw-Knox Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conduit Fittings**
V. V. Fittings Co.

**Conduits, Flexible**
Tubular Woven Fabric Co.

**Conduits, Rail**
Johns-Manville Co., H. W.

**Connectors, Solderless**
Westinghouse Elec. & Mfg. Co.

**Contracting Engineers**
Thompson Starrett Co.

**Controller Fingers**
Eureka Co.
Trigger Lock Reversible Controller Finger

**Controllers or Parts**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conveyors Belt**
Portable Machinery Co.

**Conveyors, Coal & Ash**
Portable Machinery Co.

**Conveyors, Portable**
Portable Machinery Co.

**Conveying and Hoisting Machinery**
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works.

**Cord Connectors and Couplers**
Samson Cordage Works.
Electric Service Supplies Co.
Wood Co., Chas. N.

**Couplers, Car**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Toledo Bridge & Crane Co., The

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Canton Culvert & Silo Co.
Stark Rolling Mill Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Du Pont Fabrikoid Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutting Apparatus, Oxy Acetylene**
Milburn Co., The Alex.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.,
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Works)**
Cleveland Frog & Crossing Co.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, Inc., P. Edward

**Die Blocks**
General Steel Co.

**Model 167
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and
Direct Current
WATTMETER**

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**Disconnecting Switches**
- Philadelphia Electric Company Supply Dept.

**Dogs, Lathe**
- Williams & Co., J. H.

**Doors for Bus and Switch Compartment**
- Philadelphia Electric Company Supply Dept.

**Door Operating Devices**
- Consolidated Car Heating Co.
- National Pneumatic Co., Inc.
- Safety Car Devices Co.

**Doors and Door Fixtures**
- Brill Co., The J. G.
- General Electric Co.
- Hale & Kilburn Corp.

**Doors, Asbestos**
- Johns-Manville Co., H. W.

**Doors, Folding Vestibule**
- National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
- American Steel & Wire Co.
- Electric Service Supplies Co.
- Niles-Bement-Pond Co.
- Ohio Brass Co.

**Dryers, Sand**
- Electric Service Supplies Co.
- Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
- Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
- Archbold-Brady Co.
- Arnold Co., The
- Drum & Co., A. L.
- Ford Bacon & Davis
- Holst, Englehardt W.
- Republic Engineers, Inc.
- Richey, Albert S.
- Sanderson & Porter
- Scofield Engineering Co.
- Stone & Webster
- Wells, Gardner P.
- White Companies, The J. G.
- Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**
- Allis-Chalmers Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

**Engines, Steam**
- Allis-Chalmers Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

**Fabricated Steel**
- Blaw-Knox Co.

**Fare Boxes**
- Brill Co., The J. G.
- Cleveland Fare Box Co.
- International Register Co., The
- National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**
- American Steel & Wire Co.
- Page Steel & Wire Co.

**Fenders and Wheel Guards**
- Brill Co., The J. G.
- Cleveland Fare Box Co.
- Electric Service Supplies Co.
- Star Brass Works.

**Fibre and Fibre Tubing**
- Johns-Manville Co., H. W.
- Westinghouse Elec. & Mfg. Co.

**Field Coils. (See Coils)**

**Filters, Water**
- Scaife & Sons Co., Wm. B.

**Fire Extinguishing Apparatus**
- Johns-Manville Co., H. W.

**Fire Proofing Materials**
- Johns-Manville Co., H. W.

**Floodlights**
- Electric Service Supplies Co.

**Flooring Composition**
- American Mason Safety Tread Co.
- Johns-Manville Co., H. W.

**Forgings**
- Carnegie Steel Co.
- Eureka Co.
- Standard Steel Works Co.
- Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Furnaces. (See Stokers)**

**Fuses and Fuse Boxes**
- Columbia M. W. & M. I. Co.
- D & W Fuse Co.
- General Electric Co.
- Johns-Manville Co., H. W.
- Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**
- Columbia M. W. & M. I. Co.
- General Electric Co.

**Galvanizing**
- Cattie, Jos. P., & Bros.

**Gaskets**
- Johns-Manville Co., H. W.
- Power Specialty Co.
- Westinghouse Traction Brake Co.

**Gas Producers**
- Westinghouse Elec. & Mfg. Co.

**Gages, Oil and Water**
- Ohio Brass Co.

**Gates, Car**
- Brill Co., The J. G.

**Gear Blanks**
- Carnegie Steel Co.
- Standard Steel Works Co.

**Gear Cases**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Kerschner Co., Inc., W. R.
- National Railway Appliance Co.
- Nuttall Co., R. D.
- Poole Eng. & Machine Co.
- Tool Steel Gear & Pinion Co.

**Gears, Reduction**
- Poole Eng. & Machine Co.

**Generating Sets, Gas-Electric**
- General Electric Co.

**Generators**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Goggles, Safety**
- Standard Optical Co.

**Gongs. (See Bells and Gongs)**

**Graphite**
- Morgan Crucible Co.

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
- Metal & Thermit Corp.
- Railway Track-work Co.
- Indianapolis Frog & Switch Co.

**Grinding Blocks and Wheels**
- Railway Track-work Co.

**Grounding Boxes**
- Philadelphia Electric Company Supply Dept.

**Guards, Cattle**
- American Bridge Co.

**Guards, Trolley**
- Electric Service Supplies Co.
- Ohio Brass Co.

**Harps, Trolley**
- Anderson M. Co.; A. & J. M.
- Bayonet Trolley Harp Co.
- Electric Service Supplies Co.
- More-Jones B. & M. Co.
- Nuttall Co., R. D.
- Star Brass Works.

**Headlights**
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- St. Louis Car Co.

**Heaters, Car (Electric)**
- Consolidated Car Heating Co.
- Gold Car Heating & Lighting Co.
- Holden & White, Inc.
- Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
- Cooper Heater Co.
- Holden & White, Inc.
- Smith Heater Co., Peter

**Heaters, Car (Stove)**
- Electric Service Supplies Co.
- Holden & White, Inc.
- Smith Heater Co., Peter

**Hoists and Lifts**
- Columbia M. W. & M. I. Co.
- Ford Chain Block & Mfg. Co.
- Niles-Bement-Pond Co.
- Toledo Bridge & Crane Co., The

**Hose, Bridges**
- Ohio Brass Co.

**Hose, Pneumatic and Fire**
- Johns-Manville Co., H. W.
- Westinghouse Traction Brake Co.

**Hydraulic Machinery**
- Allis-Chalmers Mfg. Co.
- Niles-Bement-Pond Co.

**Industrial Construction**
- Thompson Starrett Co.

**Inspection**
- Electrical Testing Lab's.

**Instrument Cutout Switches**
- Philadelphia Electric Company Supply Dept.

**Instruments, Measuring, Testing and Recording**
- Economy Electric Devices Co.
- General Electric Co.
- Johns-Manville Co., H. W.
- Roller Smith Co.
- Westinghouse Elec. & Mfg. Co.
- Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**
- General Electric Co.
- Irvington Varnish Co.
- Johns-Manville Co., H. W.
- Mica Insulator Co.
- Standard Paint Co.
- Standard Underground Cable Co.
- Standard Woven Fabric Co.
- U. S. Rubber Co.
- Westinghouse Elec. & Mfg. Co.

**Insulated Wire Cutters**
- Rubber Insulated Metals Co.

**Insulation. (See also Paints)**
- Anderson M. Co., A. & J. M.
- Drew Electric & Mfg. Co.
- Electric Service Supplies Co.
- Freyberg Bros., Inc.
- General Electric Co.
- Holden & White, Inc.
- Johns-Manville Co., H. W.
- Mitchell-Rand Mfg. Co.
- U. S. Rubber Co.
- Westinghouse Elec. & Mfg. Co.

**Insulators. (See also Line Material)**
- Anderson M. Co., A. & J. M.
- Elec. Ry. Equipment Co.
- Electric Service Supplies Co.
- General Electric Co.
- Johns-Manville Co., H. W.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.
- White Elec. Supply Co., T. C.

**Insulator Pins**
- Electric Service Supplies Co.
- Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts)**
- Brill Co., The J. G.
- Buckeye Jack Mfg. Co.
- Columbia M. W. & M. I. Co.
- Lackawanna Steel Co.
- National Ry. Appliance Co.
- Templeton, Kenly Co., Ltd.

**Joints, Rail**
- Carnegie Steel Co.
- Reading Specialties Co.
- Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
- Bemis Car Truck Co.
- Brill Co., J. G.
- Railway Roller Bearing Co.

**Junction Boxes**
- Johns-Manville Co., H. W.
- Standard Underground Cable Co.

**Laboratory**
- Electrical Testing Lab's.

**Lamp Guards and Fixtures**
- Anderson M. Co., A. & J. M.
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent. (See also Headlights)**
- Anderson M. Co., A. & J. M.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
- Ohio Brass Co.

**Lathe Attachments**
- Williams & Co., J. H.

**Lathes, Car Wheel**
- Niles-Bement-Pond Co.

**Lathes**
- Seneca Falls Mfg. Co.

**Lighting Regulators, Car**
- Holden & White, Inc.

**Lights, Portable Carbide**
- Milburn Co., The Alex.

**Lightning Protection**
- Anderson M. Co., A. & J. M.
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
- Anderson M. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Drew Electric & Mfg. Co.
- Elec. Ry. Equipment Co.
- Electric Service Supplies Co.
- Eureka Co.
- General Electric Co.
- Holden & White, Inc.
- Hubbard & Co.
- Johns-Manville Co., H. W.
- More-Jones B. & M. Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.
- White Elec. Supply Co., T. C.

**Locomotives, Electric**
- Brill Co., The J. G.
- General Electric Co.
- McGuire Cummings Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
- Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
- Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**
- Columbia M. W. & M. I. Co.

**Machine Work**
- Columbia M. W. & M. I. Co.
- Holden & White, Inc.

**Machinery, Insulating**
- American Insulating Machinery Co.

**Mats**
- Johns-Manville Co., H. W.

**Meters, Car, Watt-Hour**
- Economy Electric Devices Co.

**Meters. (See Instruments)**
- Electric Service Supplies Co.
- Wood Co., Chas. N.

**Mica**
- Mica Insulator Co.
- Schoonmaker Co., A. O.

**Mirrors for Motormen**
- Drew Elec. & Mfg. Co.

**Motors, Electric**
- Allis-Chalmers Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

**Nuts and Bolts**
- Allis-Chalmers Mfg. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- Hubbard & Co.

**Oil Storage Systems**
- Gilbert & Barker Mfg. Co.

**Oils. (See Lubricants)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)**

**Packing**
- Johns-Manville Co., H. W.
- Post & Co., Inc., E. L.
- Power Specialty Co.
- U. S. Rubber Co.
- Westinghouse Traction Brake Co.

**Packing Rings**
- Johns-Manville Co., H. W.

**Paints and Varnishes, (Insulating)**
- Irvington Varnish Co.
- Johns-Manville Co., H. W.
- Mica Insulator Co.
- Mitchell-Rand Mfg. Co.
- Standard Paint Co.

**Paints and Varnishes, Preservative**
- Standard Paint Co.

**Paints and Varnishes for Woodwork**
- National Ry. Appliance Co.

**Paving Bricks, Filler and Stretcher**
- Nelsonville Brick Co.

**Paving Material**
- Am. Brake Shoe & Fdy. Co.
- Nelsonville Brick Co.

**Pickups, Trolley Wire**
- Electric Service Supplies Co.
- Ohio Brass Co.

**Pinion Pullers**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- General Electric Co.
- Wood Co., Chas. N.

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**
- Bemis Car Truck Co.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Westinghouse Traction Brake Co.

**Pipe**
- National Tube Co.

**Pipe Fittings**
- Power Specialty Co.
- Standard Steel Works Co.
- Westinghouse Traction Brake Co.

**Planers. (See Machine Tools)**

**Pliers, Insulated**
- Electric Service Supplies Co.
- Rubber Insulated Metals Co.

**Plywood, Waterproof Moulded**
- The Haskelite Mfg. Corp.

**Pole Reinforcing**
- Hubbard & Co.

**Pole Sleeves**
- Drew Elec. & Mfg. Co.

**Poles and Ties, Treated**
- Lindsley Bros. Co.
- Page & Hill Co.

**Poles Metal Street**
- Bales Expanded Steel Truss Co.
- Elec. Ry. Equipment Co.
- Hubbard & Co.

**Poles Ties Posts Piling and Lumber**
- Carney & Co. B. J.
- Lindsley Bros. Co.
- Northern White Cedar Assn.
- Page & Hill Co.
- Western Red Cedar Assn.
- White Marble Lime Co.

**Poles Trolley**
- Bayonet Trolley Harp Co.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- National Tube Co.
- Nuttall Co., R. D.

**Poles, Tubular Steel**
- Elec. Ry. Equipment Co.
- National Tube Co.

**Porcelain Bushings**
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**Post Type Insulators**
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# WHAT AND WHERE TO BUY

**Potheads**
Philadelphia Electric Company Supply Dept.

**Power Saving Devices**
Arthur Power-Saving Recording Co.
Economy Electric Devices Co.

**Power Transmission Machinery**
Poole Eng. & Machine Co.

**Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Protective Devices**
Philadelphia Electric Company Supply Dept.

**Pumps**
Allis-Chalmers Mfg. Co.

**Punches, Ticket**
Bonney-Vehslage Tool Co.
International Register Co., The
McGill Ticket Punch Co.
Wood Co., Chas. N.

**Purifiers, Feed Water**
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders)**

**Railway Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Rail Welding. (See Brazing and Welding Processes)**

**Rails, New**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Rails, Steel**
Carnegie Steel Co.

**Rails, Relaying**
Zelnicker, Walter A., Supply Co., Inc.

**Rattan**
Brill Co. The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Recorders, Power Saving**
Arthur Power-Saving Recorder Co.

**Registers and Fittings**
Brill Co., The J. G.
Electric Service Supplies Co.
Exell Mfg. Co., The
International Register Co., The
Rooke Automatic Register Co.
Standard Register Co.

**Reinforcement, Concrete**
American Steel & Wire Co.
Carnegie Steel Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils)**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialties Co.

**Resistance, Grid**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley)**

**Reverse Phase Relays**
Philadelphia Electric Company Supply Dept.

**Rheostats**
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & Mfg. Co.

**Roofing, Building**
Johns-Manville Co., H. W.
Standard Paint Co.

**Roofing, Car**
Johns-Manville Co., H. W.
Keyes Products Co.

**Rubber Specialties of All Kinds**
U. S. Rubber Co.

**Sanders, Track**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Cleveland Fare Box Co.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car**
Brill Co.. The J. G.

**Sash Metal, Car Window**
Hale & Kilburn Corp.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**

**Seats Car. (See also Rattan)**
Brill Co.. The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

**Seating Materials. (See Rattan)**
Du Pont Fabrikoid Co.

**Second-Hand Equipment**
Archer & Baldwin
Cleveland Armature Wks.
Duquesne Elec. & Mfg. Co.
Electric Equipment Co.
Exell Mfg. Co., The
Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Shades, Vestibule**

**Shovels**
Hubbard & Co.

**Shovels, Power**
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.

**Signals, Car Starting**
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

**Signal Systems, Block**
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
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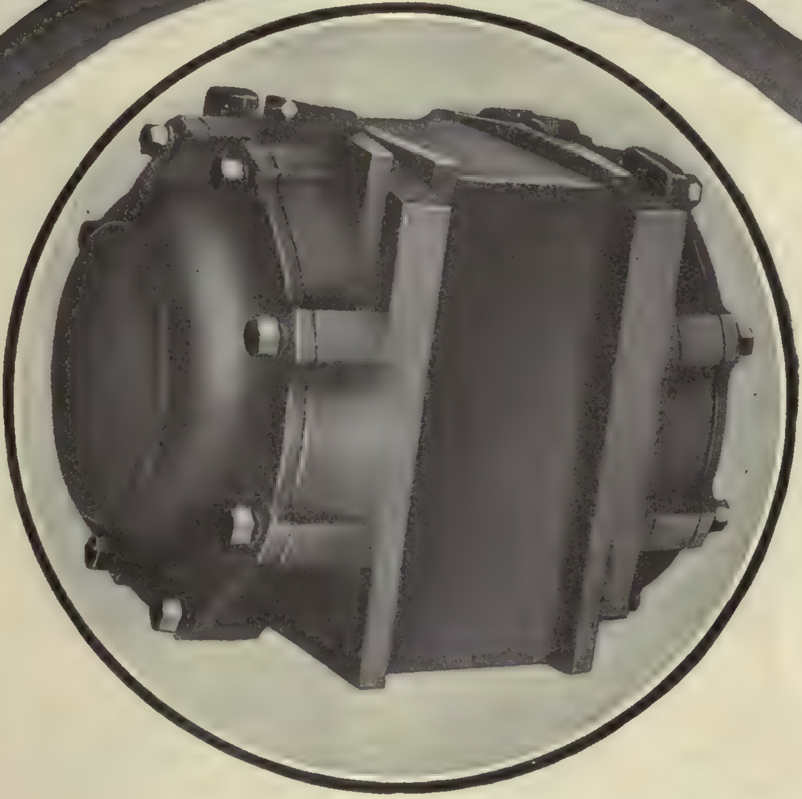

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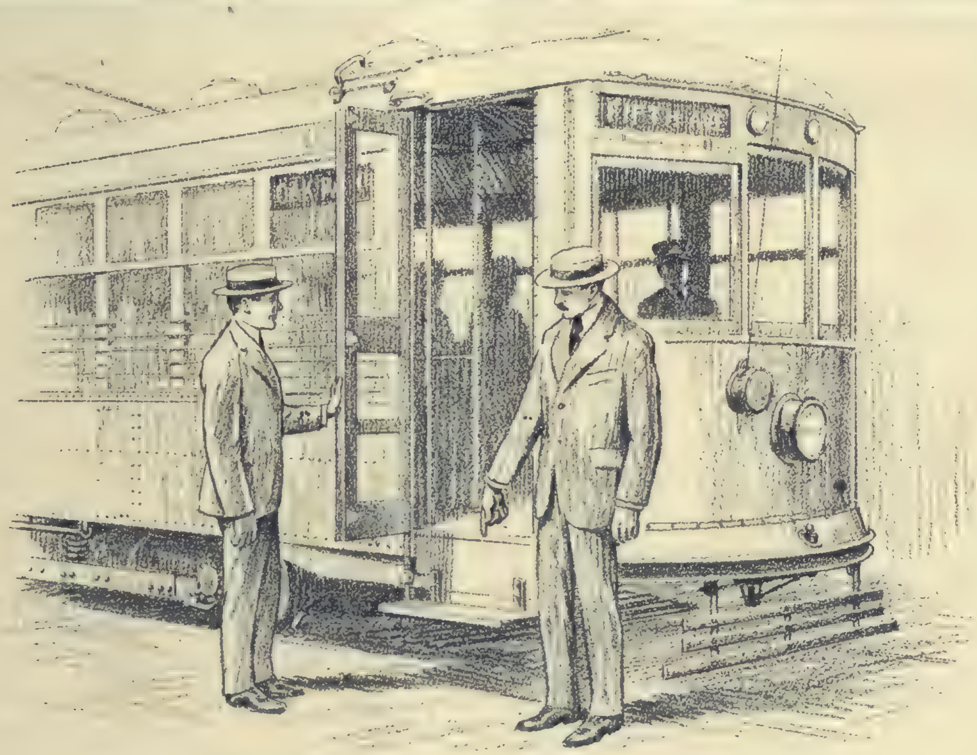

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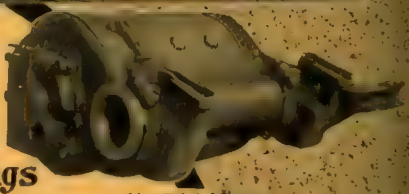

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H. W. BLAKE, *Editor*

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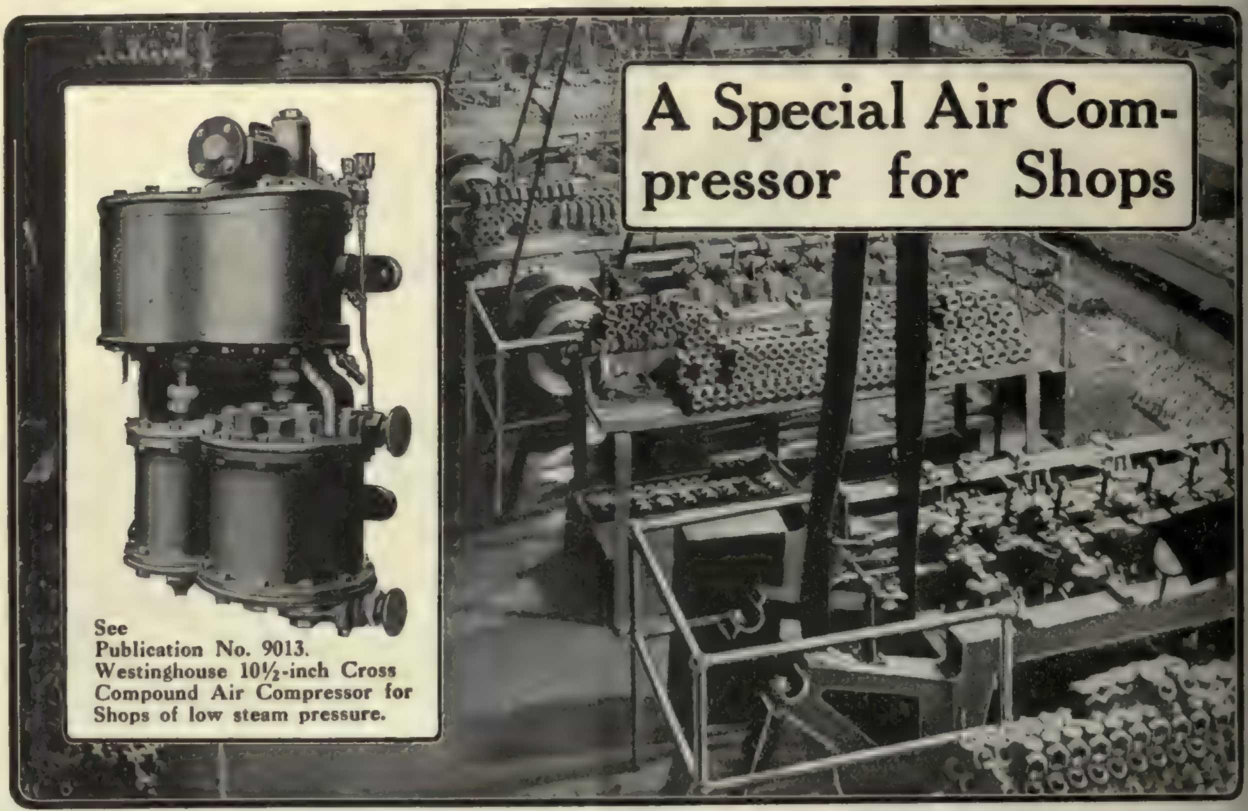

A Special Air Compressor for Shops

See
Publication No. 9013.
Westinghouse 10½-inch Cross Compound Air Compressor for Shops of low steam pressure.

In some few railroad shops the boiler plant is too small and the steam pressure is too low to permit the installation of an air compressor.

The Westinghouse 10½-inch Cross Compound

being specially designed for low steam pressure and large air volume, will permit pneumatic tool service where it would otherwise be impossible.

Westinghouse Traction Brake Company
General Offices and Works, Wilmerding, Pa.

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Boston, Mass.
Chicago, Ill.
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Houston, Tex.
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TRADE MARK

Mexico City
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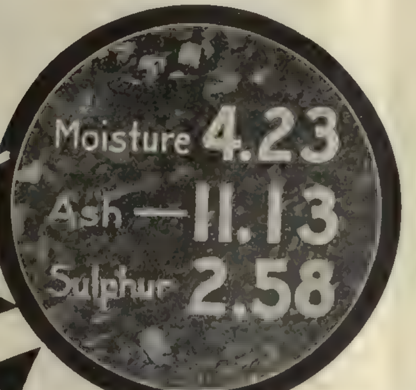
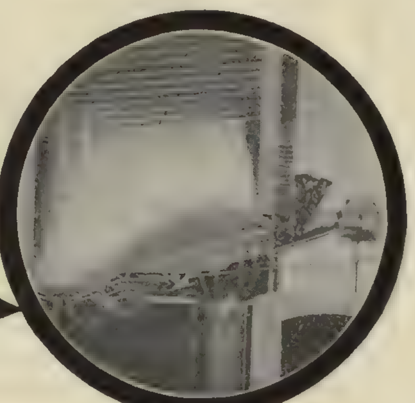
# Performance Determined the Choice—

**Fuel Analyses Showed**



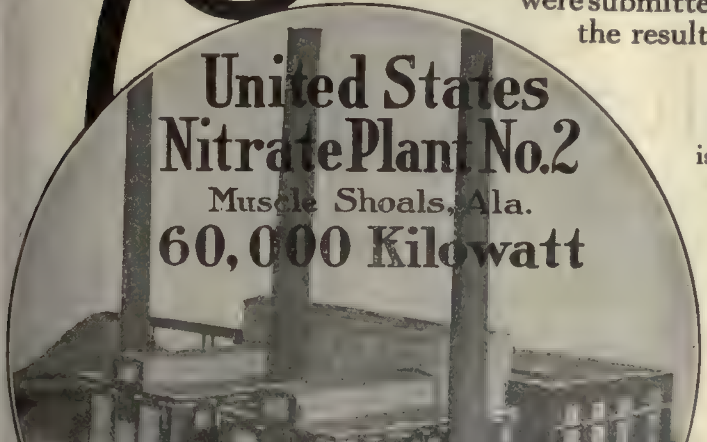
**The Stoker Selected**



## How Chosen

Owing to the results we were able to guarantee on this high-ash, high-sulphur coal, the Westinghouse Underfeed Stoker was chosen for this important undertaking.

Shutdowns could not be tolerated in this Government Nitrate Plant. The right stoker had to be found, so analyses were submitted to several stoker manufacturers, with the result here indicated.



**United States Nitrate Plant No.2**
Muscle Shoals, Ala.
**60,000 Kilowatt**

## Performance Guarantees

In spite of the objectionable fuel characteristics, with their forebodings of clinker troubles, clogged grates, twisted and broken crank-shafts, and the like, these stokers guarantee the purchaser satisfactory operation at 235% *of boiler rating continuously*, 24 hours a day, 365 days a year, with possible four-hour peaks of 275% rating.

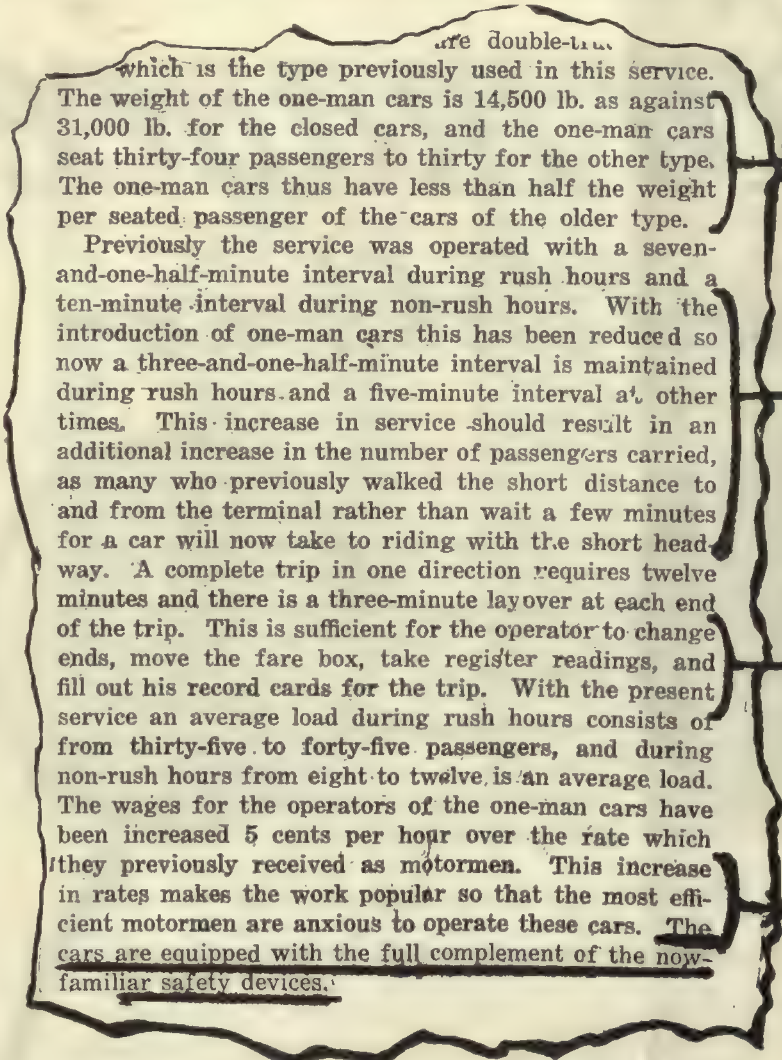
## Had Choice of Three Types

This purchaser, like all other purchasers of Westinghouse Stokers, had the choice of three types—Underfeed, Overfeed and Chain Grate. Our line covers the entire range in fuel and load requirements, which affords the purchaser the unusual opportunity of basing his selection strictly on plant conditions and requirements.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

# Westinghouse

*The Name That is found Where Reliability Counts.*



are double-

which is the type previously used in this service. The weight of the one-man cars is 14,500 lb. as against 31,000 lb. for the closed cars, and the one-man cars seat thirty-four passengers to thirty for the other type. The one-man cars thus have less than half the weight per seated passenger of the cars of the older type.

Previously the service was operated with a seven-and-one-half-minute interval during rush hours and a ten-minute interval during non-rush hours. With the introduction of one-man cars this has been reduced so now a three-and-one-half-minute interval is maintained during rush hours and a five-minute interval at other times. This increase in service should result in an additional increase in the number of passengers carried, as many who previously walked the short distance to and from the terminal rather than wait a few minutes for a car will now take to riding with the short headway. A complete trip in one direction requires twelve minutes and there is a three-minute layover at each end of the trip. This is sufficient for the operator to change ends, move the fare box, take register readings, and fill out his record cards for the trip. With the present service an average load during rush hours consists of from thirty-five to forty-five passengers, and during non-rush hours from eight to twelve, is an average load. The wages for the operators of the one-man cars have been increased 5 cents per hour over the rate which they previously received as motormen. This increase in rates makes the work popular so that the most efficient motormen are anxious to operate these cars. The cars are equipped with the full complement of the now-familiar safety devices.

E.R.J. March 1, 1919

**Saves Over ½ the Weight**

**Increases Service 100%**

**Saves Fatiguing Labor**

**Attracts the Most Efficient Motormen**

# The Safety Car

It does all these things and many others too. It reduces operating expenses and provides all-around safety to passengers.

Many roads, especially in the large cities, did not believe the safety car practical for their service. The majority of these roads are using safety cars today. They had to be convinced that these cars could make good under heavy as well as light traffic conditions.

That is why we want to make a study of your system. We want to convince you that YOU can benefit by the many advantages of the safety car.

## SAFETY CAR DEVICES COMPANY

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
Railway Exchange Bldg.

NEW YORK
City Invest. Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

# We spent royally for Defense
# Let us now spend wisely for Construction

We need good roads. **Make them.**

We need buildings—home—public and industrial. **Construct them.**

We need more railway trackage and equipment. **Produce them.**

We need homesteads for many of our returning soldiers. Drain the swamp and irrigate the arid lands and they will "blossom like the rose."

Possibly 50 million, certainly not less than 30 million horsepower, is literally running to waste in our streams. We need industrial power. Harness the streams. Build the dams. Construct the power plants.

The **immediate** carrying out of only a fraction of our needs in these lines of production will put to work every idle man and every idle dollar.

The **purchasing power** of the labor and capital thus profitably employed, plus normal demand, plus foreign demand, will keep every wheel turning, every factor of commerce busy at top speed.

Every dollar wisely expended on productive lands, buildings, railways, good roads, power plants and similar undertakings is an addition to the permanent wealth and industrial progress of the nation.

*America's Greatest Market is America*

**This space contributed to the**
**National Prosperity Campaign**
**by the Ohio Brass Co., Mansfield, Ohio.**

*Let's Go!*

# 300 Cars an Hour Under Phono-Electric

The United Railroads of San Francisco are carrying 300 cars an hour around the foot of Market Street during the rush hour. Need we expatiate as to what such service means to trolley wire on curves carrying such traffic?

Isn't it self evident that the company acted wisely in using Phono-Electric Trolley Wire where the side wear would put copper out of business in a few months?

Phono-Electric Trolley Wire is most emphatically the

WIRE FOR WEAR

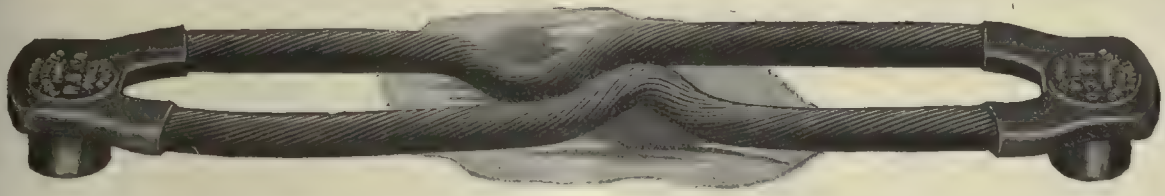
## Bridgeport Brass Company

**Bridgeport** **Connecticut**

2163

# What the Bond Tester Revealed

## The Company Has Been Losing Four or Five Dollars Per Year on This Joint



Only *one* joint. Five dollars per joint to overcome the resistance of a badly-bonded track return. A small resistance of 1/1000 ohm per bond can waste that much power per bond.

## "PROTECTED" Rail Bonds

have been on the market since the beginning of modern electric railway development. They are designed to meet successfully every bonding condition.

Besides the feature of the "Shot-Over" sleeve which prevents breakage at the most vital point—at the point of emergence of the copper strands from the terminal—"Protected" Rail Bonds form a perfect electrical contact that is proof against moisture, vibration, and all severe operating conditions.

***Our catalog of "Protected" Rail Bonds goes thoroughly into the subject of bonding. Write for your copy to-day.***

**ELECTRIC SERVICE SUPPLIES Co.**

***Manufacturer of Railway Material and Electrical Supplies***

| PHILADELPHIA | PITTSBURGH | NEW YORK | CHICAGO |
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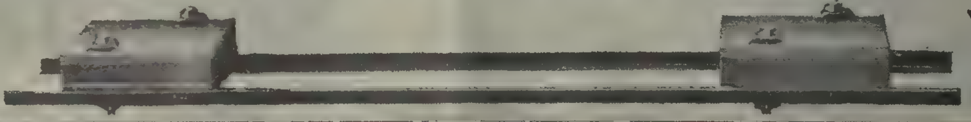
| 17th and Cambria Streets | 337 Oliver Building | 50 Church Street | Monadnock Building |

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg.

The MECHANICAL RAILWAY TIE

DMT Co



Each
DAYTON
Mechanical Tie
rests on its own
resilient cushion

The rigidity of a concrete roadbed PLUS the shock-absorbing resiliency of asphalt — that is why Dayton Mechanical Ties mean BETTER tracks at LESS cost.

They reduce not only **track maintenance** cost, but rail repair costs and they eliminate all those attendant evils that follow when wheels pound on rails that have a non-resilient foundation.

The **installation** of Dayton Ties is nearly as simple as concrete paving—and the cost is far below that of untreated wood ties in gravel ballast, labor costs considered.

A half mile on test will show which is best. Get in touch with us today.

DMT Co

THE DAYTON MECHANICAL TIE CO.
704 Commercial Building
DAYTON, OHIO

DMT Co

# Armco Iron Culverts are there to stay

These two Armco Culverts on the Dixie Highway, were installed in 1907—twelve years ago.

They have withstood two heavy floods, in 1913 and 1915, which washed the road completely away, but did not make any impression on the culverts. Today they are in just as good condition as when installed.

Culverts made of rust-resisting Armco Iron stand up year after year under the most trying conditions.

AMERICAN ARMCO INGOT IRON

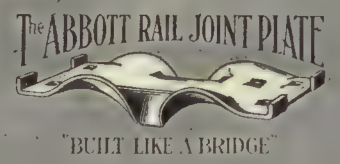
LOOK FOR THE TRIANGLE TRADE MARK

There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**
**TRANSPORTATION BLDG. CHICAGO**

## Some very good reasons for equipping your track with

# Abbott Rail-Joint Plates



A SIMPLE one-piece forging which strengthens and otherwise improves ordinary angle-bar rail joints and promotes service satisfaction and low maintenance costs by virtue of highly desirable features.

Distributes the wheel load on the two joint ties with about the same action as between a short deck bridge and its piers.

Being a separate part, the plate can be harder and more elastic, and hence afford a stronger support than the steel in the angle bars.

Compels the rails to take first bearing at their ends, because of a slight camber in the plate, and then prevents deflection of the splice bars. This avoids battering of rail ends, harmful wear of splice bars and the tendency of bolts to stretch and nuts to loosen.

The flat end bearings take the place of tie plates and preserve the ties.

The upward corner lugs engage the ends of the angle bars to prevent joints from creeping off the ties, and engage the rail bases to preserve alignment if through accident, the angle bars break or come loose.

The joints may be taken out and rails removed or replaced without disturbing the plates. The plate holding spikes are permanent fastenings.

Smooth running track surface is maintained without constant raising and tamping of joint ties.

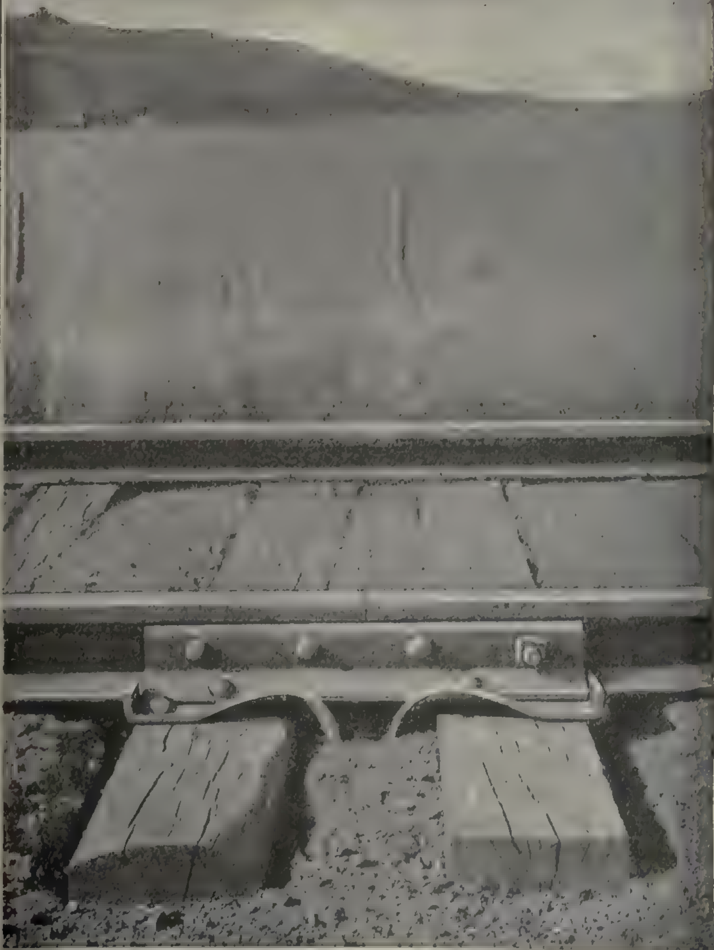
Abbott Plates are made in types and sizes for use on any rail section, are suitable for any two tie angle bar joint and may be punched for common or screw spikes throughout or for a combination of both. They are applicable to and equally advantageous on new, relaid or old track.

*Write for our booklet "Improved Track Appliances" which describes various types of Abbott Plates and the comparative advantages of each.*

**Lackawanna Steel Company**
LACKAWANNA, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati
Cleveland Detroit New York
Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products:
Consolidated Steel Corporation, 165 Broadway, N.Y.C.
308



# nspection of Equipment on Basis of Work Done

(Patent Applied For)

## *The Economy Power-Saving Railway Meter Provides the Safest and Most Efficient Basis for Equipment Inspection*

Most parts of a car require inspection at intervals oportionate to work done.

Neither mileage run, elapsed time, power-on time any other time factor correctly measures the work ne by the car.

*Kilowatt-hour consumption between inspections is e safest, most effiicient and most readily available easure of work done by the essential parts that wear d need inspecting.*

*The Economy Power-Saving and Car Inspection Meter provides a method that accurately and automatically shows when inspection is needed. It also shows at a glance how much more work a car can do before inspection is needed or, in case of a road failure, how much work it has done previous to the failure.*

The result is more thorough inspection without increased labor cost or the previous standard of inspection for less labor cost.

# Car Inspection Dials

## On Economy Power-Saving Railway Meter

This is a rugged watt-hour meter. Top dials for motormen's power-saving records. Lower dials for car inspection use.

When the meter-driven hand on dial A reaches the marker set for this car at 6, the barn man knows that the brakes and controllers have done their work and are due for an inspection equivalent to that otherwise made daily.

Likewise dial B shows when the car has done sufficient work to require oiling. This supplants the usual time or mileage period for oiling.

Dial C shows when the car has done sufficient work to require general inspection.

After any inspection the meter-driven hand is set back to zero by means of its reset rod at the bottom of the case.

A lock prevents unauthorized resetting of inspection dials.

The Economy meter with inspection dials is readily adaptable to any electric car or locomotive operating condition.

It is the only power-saving device whose unit is correct for use in determining when cars should be inspected.

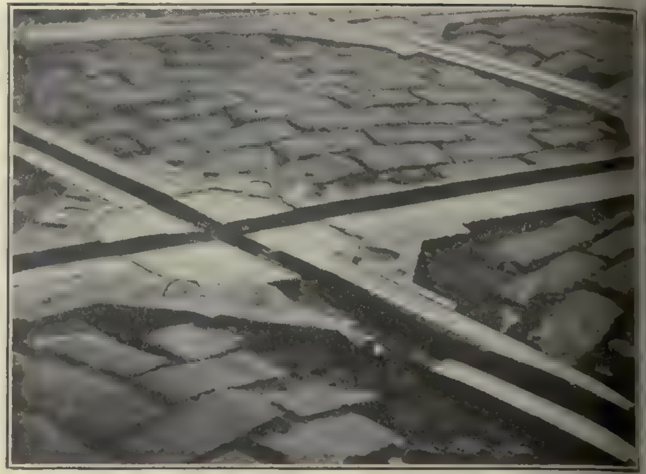
The Economy Railway Meter saves Power and Car House Labor.

***It Meters the Energy—***
***that's what you want to save***

# CONOMY ELECTRIC DEVICES COMPANY

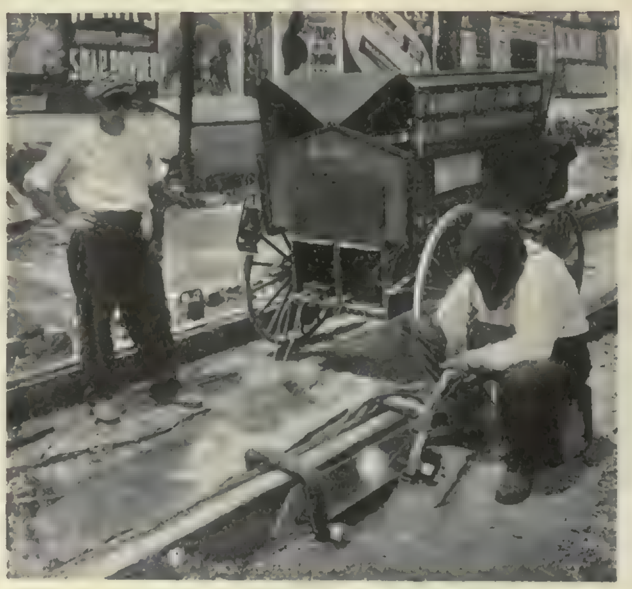
**General Sales Agent: Sangamo Economy Railway Meters**
**Old Colony Building, Chicago**
**National Railway Appliance Co., New York, Eastern Representatives**

BROKEN JOINT



BROKEN RAIL HEAD

The
Men
May Be
Unskilled



The
Track
May Be
Old and Worn

## But It Can Be Made Good As New

## —Make It That Way with the Indianapolis Electric Welder

Build up the weak spots in your old rails. Make cupped rails, broken frogs, switches, cross-overs, joint plates, etc., good as new.

The Indianapolis Electric Welder will do the work—simply, quickly and economically.

Indianapolis Welders used in connection with Indianapolis Joints and Bonding plates, reduce track maintenance costs to a minimum.

*Further details and prices on request*

**Indianapolis Switch and Frog Company, Springfield, Ohio**

# National Pneumatic Door and Step Control Would Have Secured This Fare

How often do conductors refuse to open the doors in the face of a panting passenger just as he finishes a 100-yd. dash?

Because it's too much like work to open the doors again even though the car is not yet under way.

The long-ride prospect on whom you lose money will wait for the next car.

The short ride prospect on whom you make money will WALK.

Make it effortless for your conductor to open and close the doors and you gain both money and good-will.

**NATIONAL PNEUMATIC COMPANY**
INC.

50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

# How Thermit Insert Welds make rails jointless

## The Ten Steps

1—Placing the Insert
2—The Sand Molds
3—Clamping the Molds
4—Preheating
5—Filling the Crucible
6—Pouring the Steel
7—Removing the Molds
8—Grinding the Mold
9—Maintaining Traffic
10—Inspection trip

## 2. "Here you see the sand molds—like those used in a foundry"

"Our last film showed how the insert was placed between the rail heads. Now for the sand molds.

"The molds are similar to those used in ordinary foundry practice. They are provided with pouring gates, risers and an additional opening called the heating gate.

Through this the rails are heated red hot and the molds dried out before pouring the weld.

"Now you are ready to see the molds clamped to the rail. Watch closely."

**See these movies on your office wall!**

*We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.*

**Metal & Thermit Corp.**
**120 Broadway, New York**

**BRANCHES**

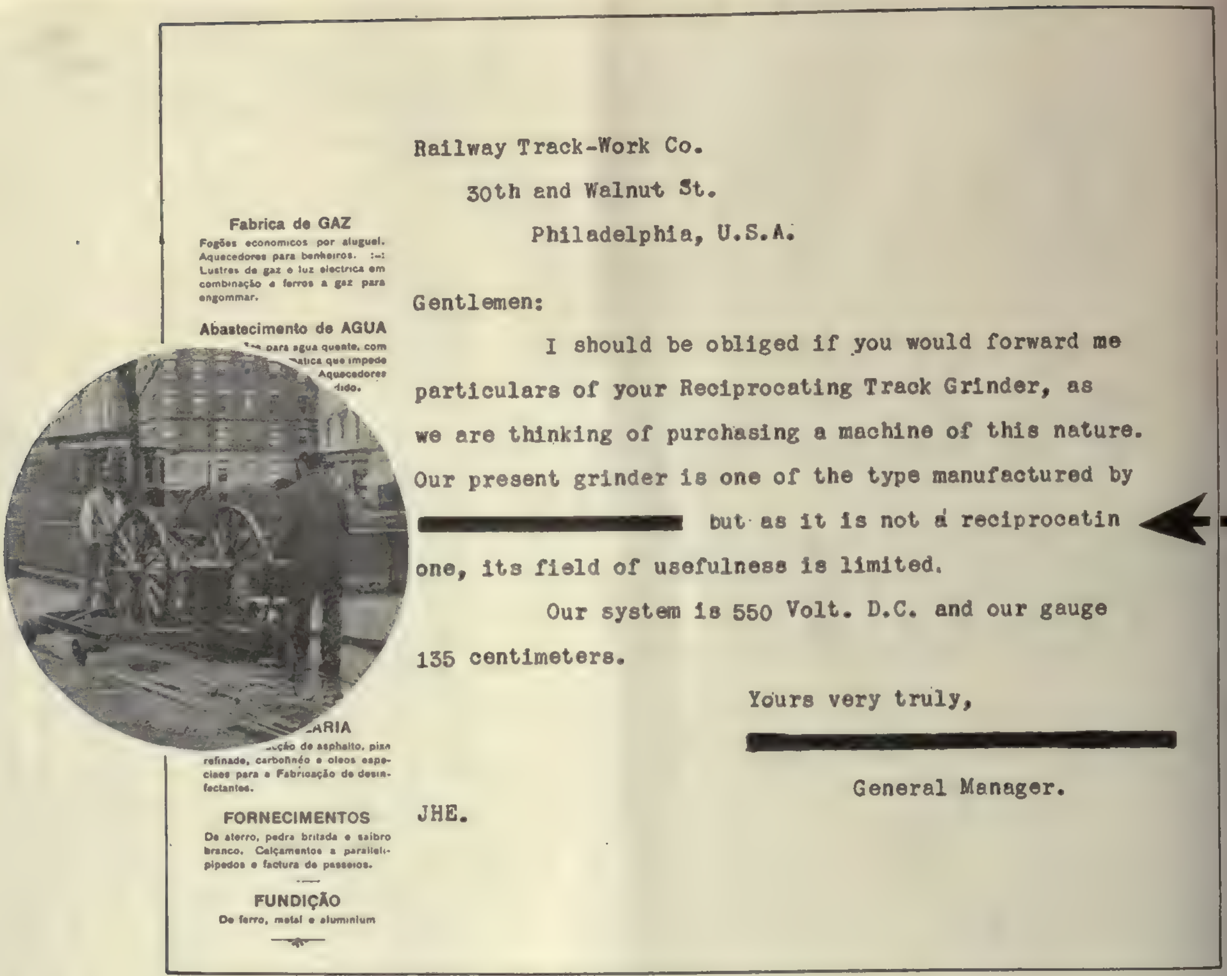
329-333 Folsom St., San Francisco. 15 Emily St., Toronto, Ont. 7300 So. Chicago Ave., Chicago. 1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrom N. J.; Wyandotte, Mich., East Chicago, Ind.; Jersey City, N. J.

DAVIS
STEEL
WHEEL

Light weight and excess strength is a combination found only in the Davis Wheel.

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST. LOUIS



**Fabrica de GAZ**

Fogões economicos por aluguel. Aquecedores para banheiros. :—: Lustres de gaz e luz electrica em combinação e ferros a gaz para engommar.

**Abastecimento de AGUA**

para agua quente, com
atica que impede
Aquecedores
dido.

**ARIA**

ção de asphalto, pixe refinado, carbolinéo e oleos especiaes para a Fabricação de desinfectantes.

**FORNECIMENTOS**

De aterro, pedra britada e saibro branco. Calçamentos a parallelipipedos e factura de passeios.

**FUNDIÇÃO**

De ferro, metal e aluminium

Railway Track-Work Co.
30th and Walnut St.
Philadelphia, U.S.A.

Gentlemen:

I should be obliged if you would forward me particulars of your Reciprocating Track Grinder, as we are thinking of purchasing a machine of this nature. Our present grinder is one of the type manufactured by [redacted] but as it is not a reciprocatin one, its field of usefulness is limited.

Our system is 550 Volt. D.C. and our gauge 135 centimeters.

Yours very truly,

[redacted]

General Manager.

JHE.

# The Voice of Experience

If the experience of this South American company in connection with track grinders stood by itself alone it would hardly be conclusive enough to be of importance. But it is precisely the same as that of scores of electric railways in the United States who have found that the

# Reciprocating Track Grinder

is the only machine that answers the demands of every condition and does the work cheaply, efficiently and thoroughly.

You can prove this fact to your satisfaction on your own tracks at our risk.

## RAILWAY TRACK-WORK COMPANY

**30th and Walnut Streets, Philadelphia**

# Lincoln Dynamotor

## Portable Bonder and Welder

The Lincoln Dynamotor is Instantly Convertible for Shop Repairs

### Leaky Bonds Waste Dollars

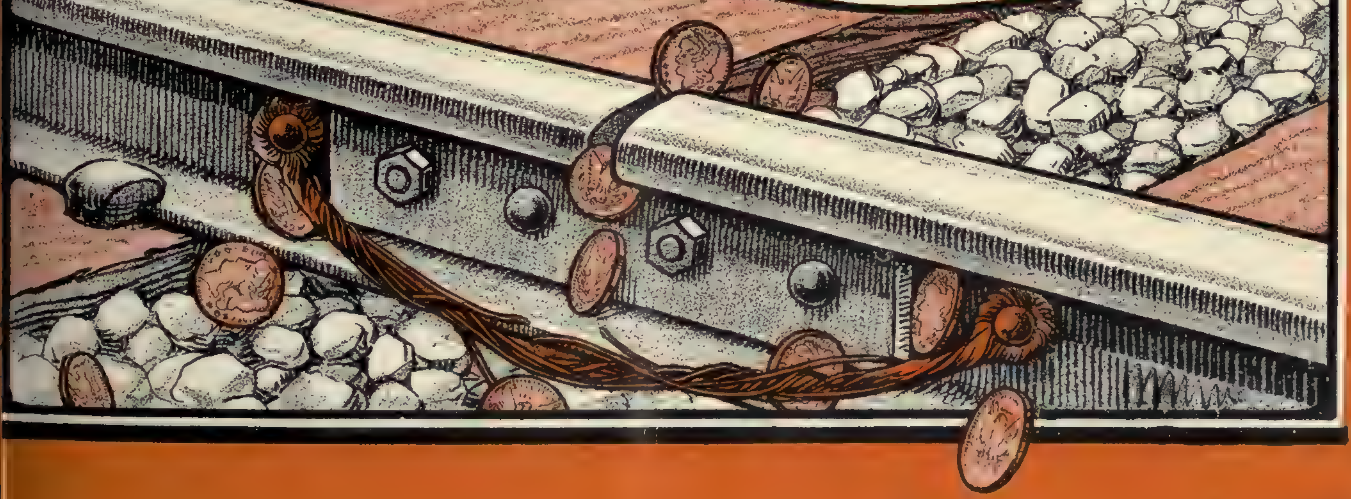
Every defective bond on your tracks is a thief of your dollars.

It is robbing your company of power—it is helping to slow up your car service—it is a leak through which profits are draining away day and night.

Save those dollars. Bond your rail joints with Lincoln Bonds securely **welded** into one piece with the steel of the rails by a Lincoln Dynamotor.

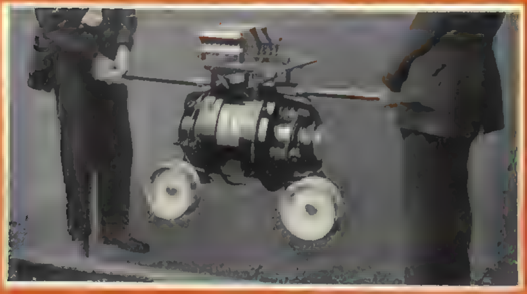
THE LINCOLN BONDING CO.
Cleveland, O.

The Lincoln Bond cannot break or work loose because it is *welded* into one piece with the rail.



OVER

# Stopping the Power Leaks with the Lincoln Dynamotor



Every Lincoln Bond welded by the Lincoln Dynamotor is a permanent insurance against current leakage in your tracks.

The Lincoln Bond is made of specially drawn, heat treated, **laminated** copper. Its design and flexibility render it capable of resisting the vibration, heat, cold, and moisture which so often prove fatal to other bonds.

The heat of the carbon arc produced by the Lincoln Dynamotor **welds** the heads of the bonds right into the steel of the rail. An important feature of the Lincoln Bond is that the heads of the terminals are built up on the bond at the same time they are being welded to the rails. In this way **every lamination** is securely welded.

The Lincoln Dynamotor is handled by two men, yet they can easily instal 15 Lincoln Bonds an hour.

Let us show you **right on your own tracks,** why you need the Lincoln Dynamotor. Write us for a demonstration.

Not only will the Lincoln Dynamotor save your dollars on the tracks but it is instantly convertible for doing repairs to all kinds of worn and broken car equipment and reclaiming it again for useful service.

## The Lincoln Bonding Co., 636 Huron Road Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City.
LINCOLN BONDING CO., - - - Fisher Building, Chicago, Ill.
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia, Pa.
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building, Pittsburgh, Penn.

CHATTANOOGA ARMATURE WORKS, - - Chattanooga, Tenn.
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.
BURTON R. STARE COMPANY, - - Yesler Way, Seattle, Wash.
A. A. WIGMORE, 441 Pacific Elec. Bldg., - - Los Angeles Calif.
CHARLES N. WOOD COMPANY, 14 Federal Street, Boston, Mass.

## The Center of Traffic in Oil, Coal and Steel

The development of adequate railway service changed the whole direction of Pittsburgh's commerce.

In 1846, at the time the picture was made from which the above illustration is reproduced, Pittsburgh commerce was largely water-borne. With the development of railway facilities Pittsburgh found, of course, tremendous increase of opportunities for the outlet of its products East and North.

Today in population alone Pittsburgh is more than thirteen times as large as it was at the time of this picture, and the growth in the increase of its commerce may be judged from the fact that its total annual output was valued in 1846 at the handsome sum of seven millions of dollars!

Internal as well as external railway development has aided Pittsburgh's mighty growth. The Pittsburgh Railways Co. alone operates 605 miles of electric railway track for the intramural service of the population. And in both the internal and external railway activity an important and helpful part has been played by

**Galena Oils**
**and**
**Galena Service**

**Galena-Signal Oil Co.**
Franklin, Pa.

# The Electric Railway Industry Is "coming back"

AS A GREAT NATIONAL INSTITUTION, *essential to modern civilization, it cannot fail to do so. Present conditions will change. The industry must and will progress. Years of optimism, activity and expansion lie before us.*

AN IMPORTANT ELEMENT *in the return of prosperity on an abiding basis is the widest possible dissemination among electric railway men of information that will help them to improve their service, their finances and their public relations.*

---

PRACTICAL HELPS for the Electric Railway Shop, Track, Power, Line and Rolling Stock Departments supplies this type of information in abundant measure.

It is a new book, written out of the experiences, investigations and observations of men of recognized ability and of the highest standing in the industry.

COMBINING the authoritativeness of a textbook with the serviceableness of a handbook of present-day practices, it covers the whole range of physical equipment—operation and maintenance, fundamental principles and practical methods, materials and appliances, organization and department economies.

Presenting 29 important articles that were followed with keen interest by the thousands of executives, engineers, operating and non-technical men who first read them in *Electric Railway Journal*—it is a book that belongs on the desk of every electric railway official or department head.

THE BOOK may be secured in combination with a subscription —either new or a renewal—to *Electric Railway Journal,* whose news, week by week, of the thought, activity, practice and progress of the great industry which it serves, is now, more than ever, of vital necessity to the men whose brains and energy will rehabilitate electric railways.

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**325 pages, 6 x 9 in. Well illustrated. Thoroughly indexed. Cloth bound.**

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**Section II—(7 Chapters)—In the Power House, by Hartley LeH. Smith, Engineer of Tests, Brooklyn Rapid Transit System.**

**Section III—(7 Chapters)—Out on the Transmission Line, by Charles R. Harte, Construction Engineer, The Connecticut Company.**

**Section IV—(7 Chapters)—Car Equipment, by C. W. Squier, Electrical Engineer.**

**Section V—(3 Chapters)—Car Design, by Norman Litchfield.**

-----------------------------------------------TEAR OFF HERE-----------------------

ELECTRIC RAILWAY JOURNAL,
Tenth Ave. at 36th St., New York

Send me ELECTRIC RAILWAY JOURNAL for one year, and include a copy of "Practical Helps for the Electric Railway Shop, Track, Power, Line and Rolling Stock Departments." If the book is not satisfactory, I will write you in 10 days for mailing instructions and postage for its return at your expense. If it pleases me, I will remit $4.85 in 30 days, in full payment of both the book and the paper. (In Canada, $6.35; in Foreign Countries, $7.85.)

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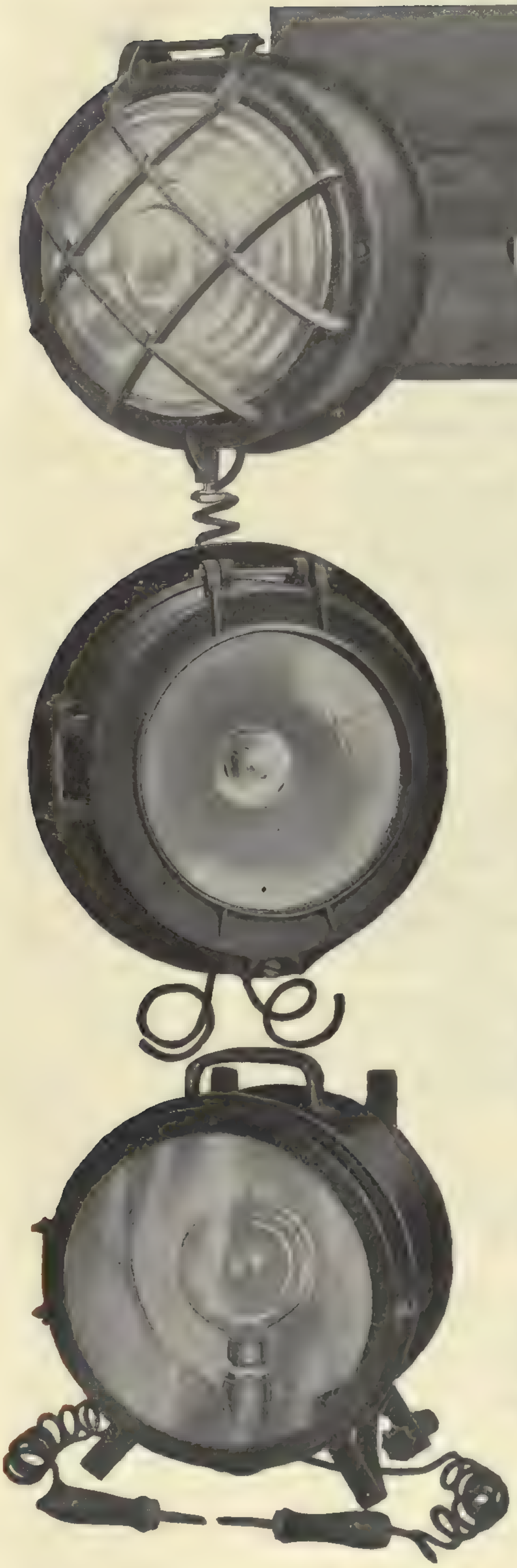

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# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

*Volume* 53 New York, Saturday, May 24, 1919 *Number* 21

## Possible Reforms Are Denied to Private Companies

DEVELOPMENTS in Seattle since the municipality took over the transportation system give a somewhat amusing illustration of the difference that a point of view makes. For years the privately operated company in that city struggled along against adverse circumstances, getting no substantial help from the local authorities. Conditions there were practically the same as with other railway properties in all sections of the country. Immediately upon securing possession of the system, the city, under the direction of the superintendent of public utilities, quickly found ways to put into effect methods of economy which would have been thought improper concessions when the system was privately owned. Among the changes which have either been made effective or are contemplated are: Abolishing of all free rides, including city officials, firemen and policemen; inauguration of skip stops; prohibition of the parking of automobiles in the business district, and abandonment of non-productive feeder lines. Here we have a repetition of the policy of the federal government after it had taken over the steam roads and suddenly found it necessary and practicable to advance passenger and freight rates, although the Interstate Commerce Commission could not see its way clear to do this before. The changes made in Seattle are only part of what could be done for public utilities elsewhere. When the public has the whip hand, however, it does not believe in making concessions to the privately owned or operated companies. The people do not seem to realize that the betterment of their communities is bound up in the transportation systems. Perhaps a few more cases like that of Seattle will help to convince them that these companies have been seeking only justice, and what is fair for one is fair for another. These instances may not be without beneficial results.

## Federal Commission Authorized

WE WELCOME the news of the approval by the President of a federal commission to take up the problems of the electric railways and to be composed of representatives of the departments of Commerce, Labor and the Treasury, the municipalities, the commissions, the bankers, the operators and the operatives. The matter is of national importance for several reasons. One of these is because any general impairment of the country's local transportation systems is bound to have a serious effect on all business and commerce. A second reason is that the securities of these companies are very widely held by individuals and institutions throughout the country and form the basis for credit which is being imperiled by the present situation. A third incentive to federal action is found in the interests of the three hundred thousand employees of these properties. We hope the proposed investigation will speedily remove the obstacles which in various municipal and commission jurisdictions have prevented electric railways from securing rate justice.

## New York Law Makes Employment of Women Impracticable

THE welfare workers of New York have had their way and there is now on the statute books of that State a law which provides that women employees of transportation companies cannot work more than nine consecutive hours a day, fifty-four hours each week, six days each week, or before 6 a.m. or after 10 p.m. The result of this must be the practical disappearance in New York of women from a field which afforded higher pay and less arduous conditions than many other lines of work open to them. The exigencies of city traffic absolutely necessitate "swing" runs and as long as there is a morning and an evening peak the employee who is not permitted to work more than nine consecutive hours cannot fit into schedules which such circumstances require. A possible alternative would be to give them short runs as morning or evening trippers, but as these runs would amount to not more than from three to five hours a day, it is hardly possible that this plan would afford at the hourly rate sufficient remuneration to the employee to make these runs worth while. An especially unfortunate feature of the situation is that the law applies not only to women conductors but to women ticket choppers and ticket sellers as well. While the use of female help on the cars is of recent introduction, many of the ticket sellers have been in the employ of the Brooklyn Rapid Transit Company for years, and they suddenly find themselves deprived of remunerative employment through no wish of their own or of that of the employing company.

While the field for women in railway service has its limitations, it is undoubtedly true that the women have made good in this line of work in New York to the extent that they have been employed. According to all accounts man labor will continue scarce, and for this reason the transportation companies would probably have kept its women employees in service as well as because it felt gratitude to them for having helped out in an emergency. But now that the law has made this impossible the best they can do is to wish the women good luck and the speedy acquisition of other remunerative work.

### Retain Policy of Stop Omissions

AN OPERATING company in the East, in service improvement news prepared for the local dailies, announced recently that it had restored many of the stops discontinued during the height of the war for the purpose of fuel saving. Granting that the addition of stopping points is sometimes a local convenience, it seems unfortunate, none the less, to be obliged to restore these unless a company finds it impossible to continue to operate at a profit on the limited service plan.

We believe that emphasis should be laid upon the improvement to the service as a whole and to that of particular neighborhoods resulting from curtailment of stops, and that the restoration of stops should never be taken as publicity material for illustrating service betterments. In countless instances the lengthening of space between stops results in faster transit even for the patrons of a company who walk a greater distance to or from their cars. No sensible manager would advocate utterly unreasonable distances between stops, but it is easy to demonstrate that before the war stops on many systems were far too close together, and now that the public has become used to the change, it seems a great pity to attempt to revert to the old practice. The public, as well as the company, is the gainer by the operation of a plan of restricted stopping points.

### Bigness Brings Its Own Problems

THE Toledo joint company section of the American Electric Railway and other national associations contains practically 1000 electric railway members. The very magnitude of this membership must impose heavy burdens upon the local management because the interests of the members are so diversified. The same situation is facing other company sections on a smaller scale, and will confront more as the membership expands under the relief from war-time pressure. A good salesman can get people into a company section, or into any worthy organization for that matter, but it takes an administrator of experience and judgment to maintain the interest of the members and continue to benefit them after they have joined. A few thoughts along this line may prove suggestive.

Section meeting programs should combine instruction and entertainment, each in such measure that the average attendant goes home feeling more kindly toward his associates and with a thought in his head which he can apply in his daily work. During the war the tendency seems to have been to run largely to entertainment, presumably as an offset to the depressing conditions of every-day life, but the company section will fail of its main purpose if it does no more than entertain its members. On the other hand, heavy lectures are out of place at the meetings because the men are tired after a long day's work and instruction for them must be put into tabloid form, sugar-coated. Entertainment of large groups is easier than instruction, hence the danger of overdoing the amusement features. To simplify the instruction work it may be wise to divide very large sections into departmental groups for various discussions, with general gatherings for social purposes.

We hope and believe that the company section movement will soon take a spurt. But a spurt is only a means to an end. Long-run success depends upon the thought that is put upon the devising of programs of real merit.

### Is the Trolley in Danger of Becoming Extinct?

IN ITS ISSUE for May 17 the *Literary Digest* presents a rather miscellaneous collection of clippings relating to the present electric railway situation under the heading "Is the Trolley in Danger of Becoming Extinct." While the general impression given by the article is a fair picture of the electric railway business at the moment, the reader is left somewhat in the air as to whether the country is soon to be deprived of its electric railway service, some other transportation agency displacing it.

The thoughtful railway man asks himself frequently: "How long can we continue to give service under the present conditions?", but he hopes and believes that conditions are going to be ameliorated soon. The *Digest* says: "The vanishing trolley car may disappear completely if present tendencies continue." Quotations show that this conclusion is based in part at least upon a statistical article in one of the New York daily papers, in which the writer intended to demonstrate the urgent need of the utility for help in the present crisis, rather than to suggest its possible doom.

The *Digest* was undoubtedly influenced also by an erroneous report that "Five hundred members of the American Railways Association" (whatever that is) "recently got together and passed resolutions urging the traction managers everywhere to 'lend all possible aid in the promotion of legislation to bring about the public ownership of all electric railway lines.' "

Now with all due appreciation of the gravity of the present situation, we cannot overlook certain facts bearing upon the situation. We feel, in fact, as did Mark Twain when he said that certain reports of his death were greatly exaggerated. As for the "vanishing" characteristic of the trolley car, statistics fail to disclose it. The Census Bureau figures just issued show a total of nearly 103,000 cars in use in 1917 as compared with slightly more than 94,000 in 1912. A canvass made by this paper a few months ago checked closely with the above as to total and showed that more than 2400 cars were ordered in 1918. These numbers are not as large as the public and railway managers would like to see, but they do not indicate that the electric railway is a vanishing quantity. It is safe to say that there is more demand for electric railway transportation, taking the country by and large, than ever before. The only trouble is that the public does not realize fully yet that the railways are subject to the higher cost of operation which affects every other industry and that they must have more money. Higher net earnings, based on a system of higher fares, would cure all the railways' present ills. Until they are secured, the electric railways cannot give the service which the public needs. Some will pass into the hands of receivers and a few of the weaker lines may be abandoned, not in favor of any substitute but because they are prevented from charging an adequate fare. It is this very permanence of the electric railway as a whole which is an added reason for its fair treatment by the public.

## Track Spiral Standardization Deserves Further Consideration

ABOUT one year ago the columns of this paper contained a number of communications relating to the securing of greater uniformity in track spirals. The subject is still before the committee on way matters of the American Electric Railway Engineering Association, ond it may not be out of place to comment upon the sentiments so far expressed. In the first place, we are inclined to the view that in the general consideration of this subject the main object has been partly overlooked, and that there has been much criticism with but little of helpful suggestion. While it is interesting to consider reasons why it would be impracticable to adopt a set of track spiral standards it is more important to point the way to ultimate adoption of such standards.

We take it to be the object of the committee's investigation, first, to determine whether it is possible to find or develop a suitable system of spirals. Since there are three principal manufacturers' spirals now largely used, it may safely be said that it is possible. Second, the fact that most railways use some of these three spirals indicates that standards are not only possible but also very desirable.

If we are to get anywhere there must also be an agreement in effect that some sacrifices are necessary in obtaining the object sought; hence the problem should be approached with an open mind and in the spirit of compromise. Perhaps the system of spirals proposed by E. M. T. Ryder was, to some extent, too radical in outlining a comparatively new system throughout. In view of the discussion thereon we think it very likely that the committee should abandon the attempt to produce something entirely new, particularly because the system proposed by Mr. Ryder does not vary much in final results from existing systems. Would it not be better to take a census of the use of the three manufacturers' spirals and, with the most popular one as a basis, to settle upon the few modifications needed to provide for American Electric Railway Engineering Association switch pieces and then adopt it as a standard? It would thus be possible to utilize existing patterns, which practically every manufacturer already has, for the several manufacturers' spirals in current use. In the meantime it must be taken for granted that no single standard can be put in effect universally overnight.

In connection with the foregoing suggestion that one of the existing manufacturer's standards be selected it is to be remembered that one contributor to the discussion last year made the suggestion that the railway companies should use exclusively the spirals of the largest three steel companies. We feel sure that most companies already use those of one of the three, although a few large railway systems have adopted their own spirals, which may or may not be the same as any one of the manufacturers' spirals. Meanwhile it is well known that the manufacturers want a standard but have been unable quite to agree as to which one of their own to select. Here, then, is the chance for the way committee to accomplish results, particularly in view of the fact that the manufacturers have stated more than once that they would be willing to adopt, as standard, any one of the three principal spirals if the Engineering Association would only make the selection. Why not take them at their word?

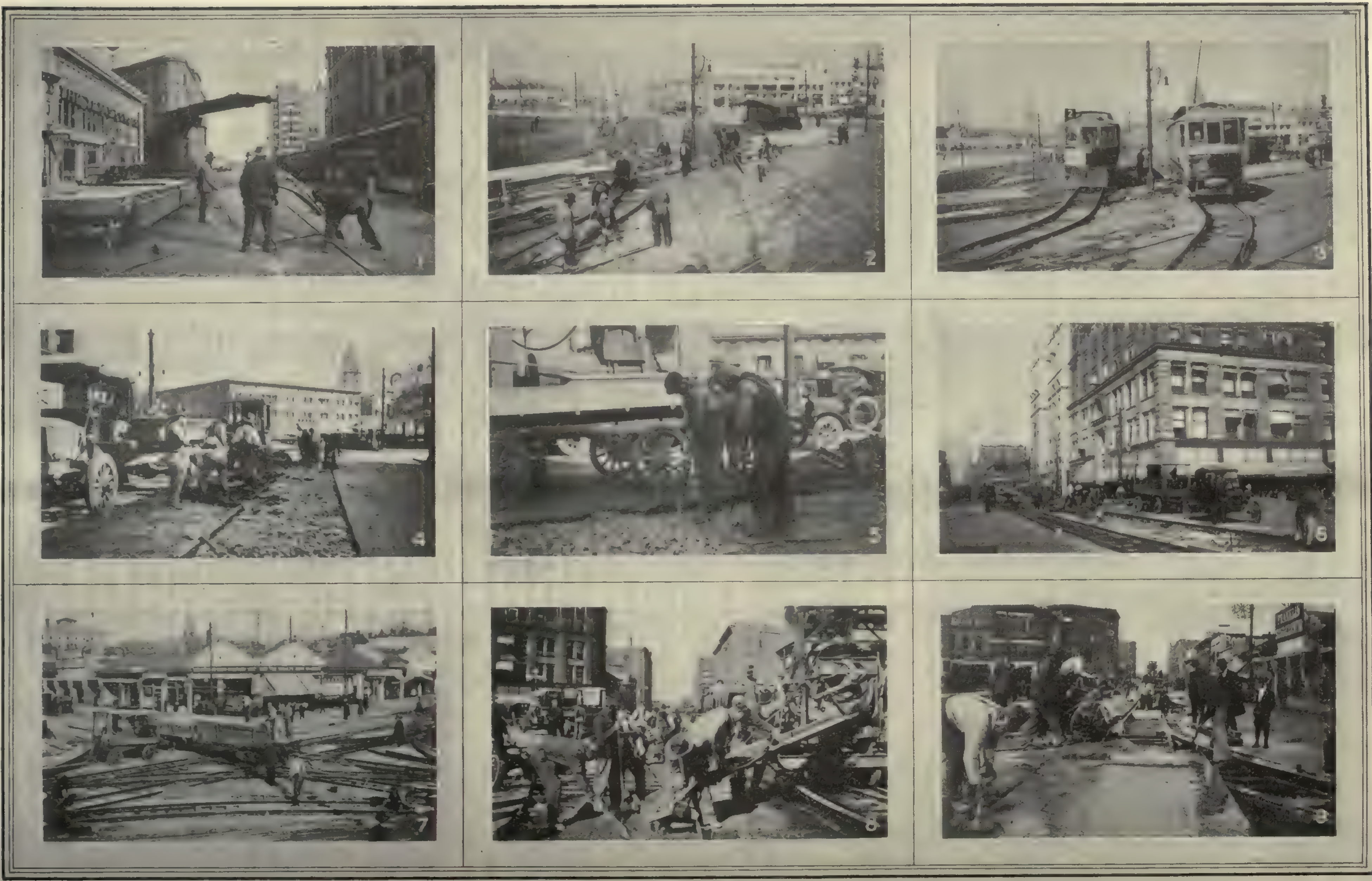
In making the selection the committee should not lose sight of the fact that the manufacturers' spirals do not provide sufficient length to permit the insertion of A. E. R. E. A. switch pieces in plain ends. There should be a sufficiency in range to meet average conditions and perhaps the plain ends may need some revision in any case. All data should be figured to the inside gage line and, if possible, the system of rotation should be made to conform with that of the American Railway Engineering Association. Meanwhile, Victor Angerer's suggestions in regard to using fewer and longer chords and cutting out unnecessary refinements should be borne in mind.

## Electric Railways Can Profit by N. E. L. A. Committee Work

ELECTRIC railway engineers who have anything to do with the generation or distribution of electric power appreciate the thorough work done each year by the committees of the National Electric Light Association which study this part of the field of that society. At least they appreciate this work if they are familiar with it. The power end of the electrical business is so large, so technical and so vital to the welfare of that industry that we may properly look to the N. E. L. A. for the most thorough and comprehensive studies in the power field. The results of the activities of the prime movers, electrical apparatus, underground construction and other committees are particularly valuable this year and we are, therefore, giving considerable space to abstracts of them in this issue. The reports themselves are very voluminous and they should be studied in detail by specialists.

War-time conditions have imposed unforeseen difficulties upon both the manufacturers and users of electrical apparatus of all kinds. This situation is clearly evident in the reports. There have been notable improvements in turbines, boilers and their furnaces, electric generators, cables, etc., but the difficulties of obtaining good material and first-class workmanship have been reflected in the operating records. Turbine trouble has been all too prevalent, due not to faulty design but to the impossibility of getting into a finished machine what the designers intended. A considerable number of generator fires were reported, due presumably to the difficulty of securing first-class operation, combined, no doubt, with the same shortcomings as appeared in turbines. In power distribution, war industries have superimposed high load-factor loads on distribution cables, reducing their carrying capacity as judged by pre-war standards.

All in all, the war period has been a hard one for the producer of electric power, but he has, to speak broadly, risen marvellously to the emergency. Power generation was considered so vital to the prosecution of the war that the industry was highly favored by the government. Such limitations as surrounded it were necessities of the time. The manufacturers and operators who devoted their energies during the war period to the insuring of an adequate and reliable power supply performed a patriotic duty of no mean magnitude.



Utilizing Modern Track Construction Apparatus on an Important Reconstruction Job in Denver, Col.

No. 1, Placing temporary track to permit shunting of cars around intersection. No. 2, "Shoo-fly" in position across corner of Civic Center. No. 3, Cars operating over temporary track. No. 4, Cutting out asphalt paving. No. 5, Breaking up paving foundation. No. 6, Track in place ready for concreting. No. 7, Construction work at intersection in full swing. No. 8, Concrete train pouring the mix. No. 9, Concreting-in the special work. Other views of this track construction job are shown on the following pages.

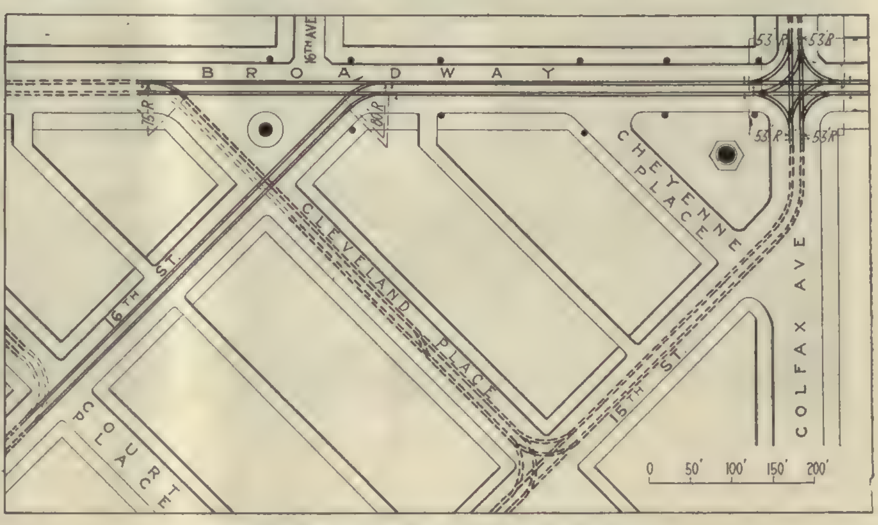
# Using Modern Appliances in Track Construction

## A Recent Contract Job in Denver Furnishes an Illustration of How Up-to-Date Equipment Gives Speed and Economy in Construction

BY W. L. WHITLOCK
Office Engineer Denver (Col.) Tramway

IN A RECENT track construction job the Denver Tramway departed from its usual practice in that it et the track construction end of the ob by contract, something that had ot been done on this system for ifteen years. The contract was let n account of the scarcity of labor nd the necessity for completing the work within a specified time. All of the rail, ties and special trackwork had been purchased and delivered, and as the Public Utilities Commission had ordered the work done there was only the labor shortage to prevent its speedy completion. The Tramway allowed the contractor the use of its track construction tools and equipment in order to facilitate the work.

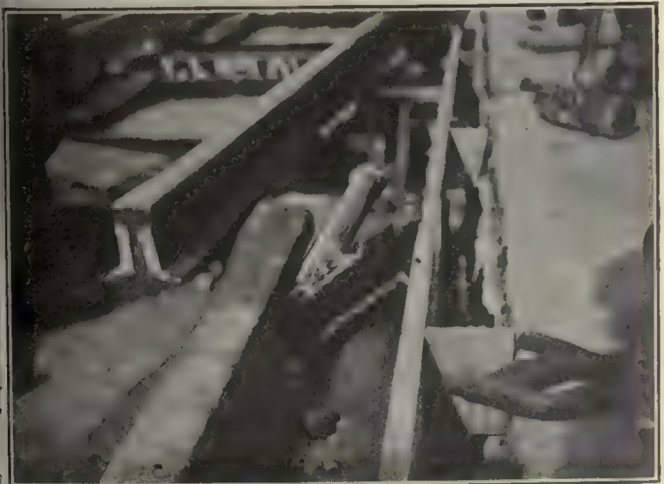
The equipment mentioned is listed below, and the list is interesting as an indication of the advance made during the past fifteen years in the art of track construction. It comprised one 5-ton, one 3-ton and one 1-ton auto truck of the self-dumping type; pneumatic paving and concrete cutters; 3-ton crane car (see issue of this paper for April 20, 1918); oxy-acetylene cutting outfit; reciprocating and Atlas rail-grinders; Indianapolis arc welder; concrete tram as described in this paper on Oct. 6, 1918; mechanical pusher for unloading dirt from flat cars; portable rock crusher and conveyor; Lincoln bonding machine; pneumatic tie tampers; portable crossovers; temporary lamp clusters, and camera for making progress records.



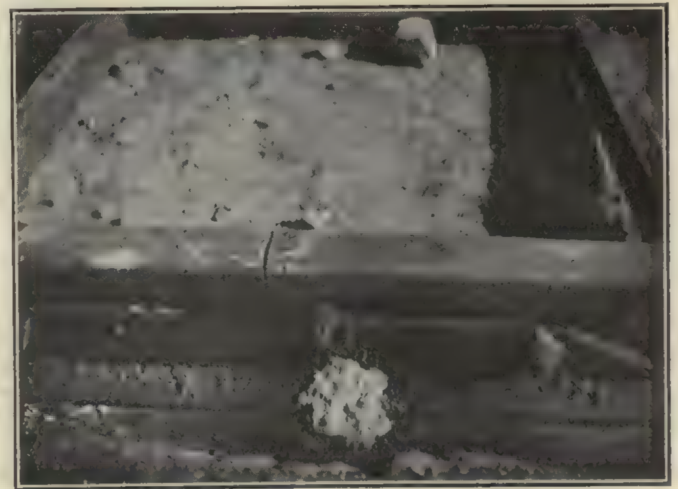
——Track and special work constructed
-----Track removed
------Old trackage still in place

SITE OF THE TRACK RECONSTRUCTION JOB IN BUSY SECTION OF DENVER

The largest layout of special work, located at Broadway and Colfax Street intersection, was of 100-lb. A. R. A. rail, cast-manganese construction. The special work at the other three locations was likewise of cast manganese but of 80-lb. rail section. All of the special work was built by William Wharton, Jr., & Company. The tangent track construction consisted of 80-lb. A. S. C. E. rail, with Apex-welded joints and International twin steel ties. The entire track structure was imbedded in concrete of a 1 : 2 : 3 mix, using crushed rock as the aggregate. The cast-manganese layouts already mentioned were supported on 9 in. of crushed rock ballast and long-leaf Texas pine treated ties. The paving was 1:2:3 concrete also with crushed rock



WELDED JOINT SAWED THROUGH, PART OF PLATE BEING REMOVED WITH AID OF WEDGE

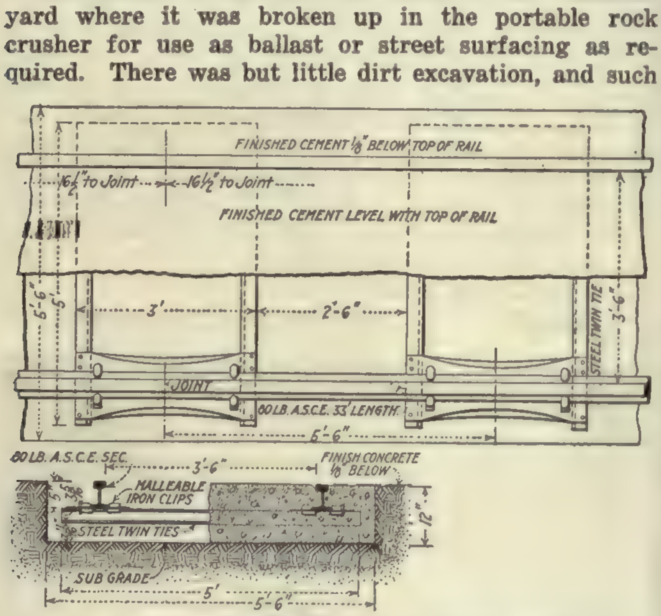


JOINT BROKEN BY RAIL CONTRACTION AND REPAIRED BY ELECTRIC WELDING aggregate. All of the construction was in streets paved with asphalt.

The several parts of the job were done in the following order with a view to utilizing to the maximum extent the several labor-saving devices.

First the field engineers marked the trench lines and the asphalt paving was cut out both by the pneumatic tools and manual labor. The paving was loaded direct to the auto trucks and hauled to a near-by dump. The men with the pneumatic tools dropped back after a stretch of asphalt had been cut out and broke up the concrete paving base. The broken concrete was stored for the time in the devil strip between the tracks. Later it was loaded on flat cars and taken to the materials yard where it was broken up in the portable rock crusher for use as ballast or street surfacing as required. There was but little dirt excavation, and such dirt as was removed was placed in the devil strip and loaded on flat cars after a temporary track had been laid. It was then hauled to the dump where the mechanical pusher, operated by the crew of the work car, was utilized in unloading it quickly.

THE NOW FAMILIAR GAS CUTTING TORCH IN OPERATION

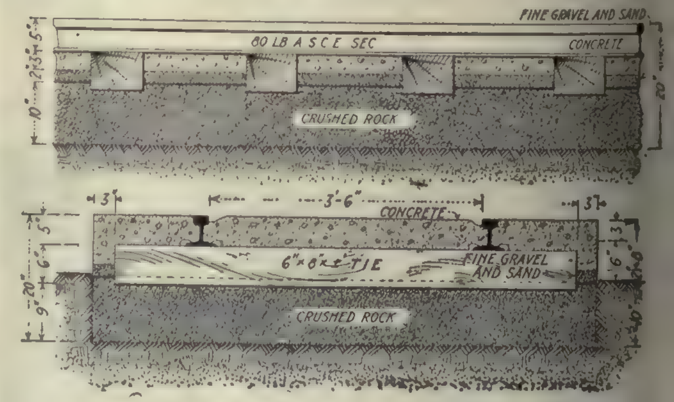


TRACK CONSTRUCTION WITH STEEL TIES

Only one track was constructed at a time, and work on the second track was not begun until a temporary track had been laid in the first trench. The rail for the first track was hauled to the job by means of the auto truck and dolly, and was distributed along the trench. This truck also brought up the steel ties and small material from the yard.

Before the track construction was commenced the trench was flooded with water for two nights to test for holes or sumps. After this test had shown the foundation to be satisfactory the steel ties were placed on 4-ft. centers and the rail was laid. It was originally intended to clip the rail to the steel ties, bolt up the joints, surface and align the track temporarily and then weld the joints. A small section of track was laid according to this plan, but when it was examined prior to welding the joints were found to be not absolutely tight as is necessary in this type of construction. The base of the rail made a tight joint but at the ball the rails were slightly open. After several suggestions had been tried out the rails were finally unclipped from the ties and two track jacks were used to bring the joint up square. One jack was used under each rail after the joint had been bolted up temporarily. The joint was then welded. After this experience all of the track was welded before the rail was clipped to the ties.

PROTECTION FOR EYES OF PASSERSBY FROM WELDING ARC ON RAIL BASE

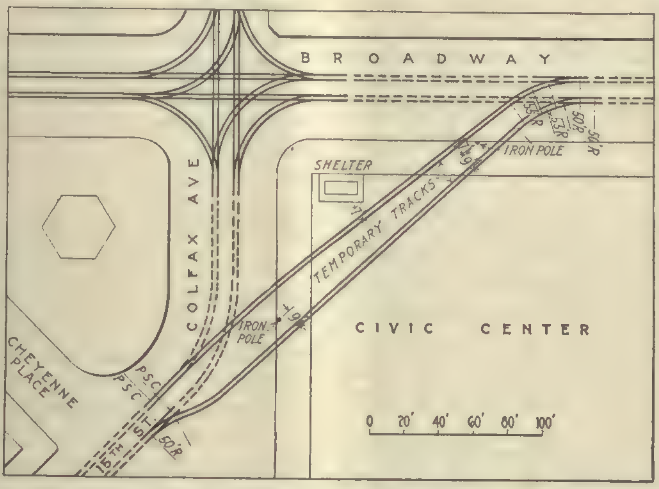


TRACK CONSTRUCTION WITH WOOD TIES

After the track was welded it was surfaced for temporary operation, being blocked up between steel ties by means of wood blocks in order to keep the weight off the steel ties.

The paving material and dirt removed from the second trench were loaded direct to flat cars operating on is temporary track. After the second track trench as completed and the ties and rails for this track ere delivered by means of work trains the materials emoved from the first trench (broken concrete and irt stored in the devil strip) were loaded on flat cars nd removed. The crushed rock ballast for the special ork was delivered by means of auto trucks and dumped irectly into the trench as needed with the exception f the Broadway-Colfax layout.

The oxy-acetylene cutting equipment was used to cut he rails of track at conecting points to avoid the ecessity for removing the rack back to the joints and hus to save the expense of dditional track and paving emoval. In the construcion of the last-mentioned ayout it was necessary to ivert the cars from this ocation to facilitate the ork. This was done by neans of a temporary or shoo-fly" track laid across ne corner of the Civic Center. Temporary crossvers with shop-built 65-lb. urved rails were used as urnouts and laid directly n the paving, tie rods being used to hold the curves to gage. Sixty-five-pound ail and second-hand ties were used on the lawn portion f the Civic Center in a shallow trench. As this location s a heavy transfer point a temporary platform of 3-in. 12-in. x 16-ft. planks was laid and suitable lights were rovided as a matter of public safety. No trouble eveloped from the operation of the "shoo-fly" although here were several heavy snowstorms and some cold veather during the short time of the service.



TEMPORARY "SHOO-FLY" TRACK ACROSS ONE CORNER OF THE CIVIC CENTER

DISTRIBUTING BALLAST ALONG THE TRACK BY MOTOR TRUCK

TRACK DRAIN FOR PREVENTING FLOODING OF SWITCH BOXES

We had two tests of the holding power of the welded oints; one premeditated, the other accidental. As we had had no experience with the welded joint we desired o know just how strong the welds were. One joint, selected without knowledge of the welders, was cut hrough several days after welding by means of a hacksaw, and one rail was removed. This gave a cross-section through the middle of the joint and indicated a satisfactory character of weld. On the remaining half of the joint the plates had to be removed to make place for another pair. For this purpose a heavy sledging steel point was inserted between the plates and the rail and a laborer with a heavy sledge was told to "knock 'em off." The plates finally came off but the steel plates bent before the weld would break. This test satisfied us as to the holding power of the weld.

The second test was caused by a sudden drop in temperature. Despite the fact that the track was opened at each end, sixteen joints broke from contraction. The break in each case was in the plate and not in the weld, indicating that the welds were stronger than the plates. On the following day the temperature rose and as the rails expanded the cracked plates came together again until only a very small seam was visible. The arc welders used carbon rods and burned these cracked places out until there was space large enough to furnish a holding place for new metal. The places were then rewelded, with entirely satisfactory results.

No trouble was experienced with the joints other than those mentioned and as far as can be observed the joints that broke and were rewelded are holding as well as those originally good.

We selected two joints, one that had broken and had been rewelded and one that was perfect from the start, for future observation. Before the track was concreted a street box with a removable lid was placed at each of these joints. This will permit observation of the joints under traffic without the necessity for tearing out any paving.

Several additional items in regard to this work may be mentioned for purpose of completeness. One which is illustrated in an accompanying picture shows the canvas strips set opposite the welding work to supplement the box used regularly by welders to protect the eyes of passers-by from the light of the arc. This box did not give sufficient protection because the welding was along the base of the rail as well as under the ball and the boxes rested on the ball only. The canvas strips did away with the objection made by people on the street that the arc shone out under the boxes.

Electric track switches of both the Cheatham and Kitt types were used and track drains consisting of open gratings were placed ahead of all switches. These drains were connected to near-by catch basins by means of 6-in. tile pipe. All electric switches were connected to the drains by tile pipe to insure proper drainage, and suitable clean-out boxes were provided to facilitate the cleaning of the tile drainage line to the catch basins. This cleaning is usually done by means of a 1½-in. hose connected to a fire plug.

The Lincoln bonding machine was used in bonding all joints of both tangent track and special work, using No. 0000 U-bonds. In addition all special work was "jumped out" by using four No. 0000 annealed trolley wires for each rail. Cross bonding on tangent track was accomplished by arc welding the steel ties to the base of the rail with spot welds, thus utilizing the steel ties as bonds.

The overhead line construction on this work consisted of tubular steel poles set in concrete with No. 00 iron trolley wire over all special work and No. 00 copper trolley wire over tangent track. The steel poles will also be used to carry the street lighting equipment owned by the city, which bore a portion of the cost of the construction. These poles form a part of the general layout of the street lighting systems in use in the business district.

## Standard Electric Railway Specifications Printed in Spanish

IN ORDER to facilitate commerce between the United States and foreign countries by gathering together and making available standards for materials of various kinds, commercially acceptable and representing good American practice, the Bureau of Foreign and Domestic Commerce, of the United States Department of Commerce, has started the publication of a series of bulletins covering industrial standards for materials. Industrial Standard No. 32 presents the text of the standard specifications for quenched carbon steel track bolts as adopted by the American Society for Testing Materials, and Industrial Standard No. 41 contains standard specifications for wrought solid carbon steel wheels for electric railway service. These are printed in Spanish and English on facing pages.

This series of publications will include standards prepared by the government and by technical societies and other organizations, which will be translated into various foreign languages. Publication in this series indicates that the standards are working standards, subject, however, to amendment as new scientific data are obtained. The standards referred to are drafted by committees of the American Society for Testing Materials, on which both the consuming and producing interests are represented. Editions of these standards are sold by the superintendent of documents, Government Printing Office, Washington, D. C., at 5 cents per copy.

## Belgium Looks Forward to Railway Electrification

### All Through the Long Period of Conflict the Little Country Continued to Plan for Its Post-War Development

IN REVIEWING the transportation plans of the Belgian government, the *Engineer*, London, says that in 1916 Mr. Seghers, the then Belgian Minister of Railways, whose offices were at Havre, appointed a commission to report to the Belgian government on the advisability of electrifying the Belgian State Railways after the war. This commission was composed of several important Belgian business men, engineers, and of the heads of the railway department then in France. In addition, the chief engineers of the French State Railways and of the Midi Railway, and Philip Dawson, were asked by the Belgian government to allow their names to be added to the commission.

Several sittings of the commission were held at Paris, and as a result recommendations were sent to the Belgian government advocating the electrification of considerable portions of the Belgian State Railways. In view of the absence of accurate data, owing to the occupation of Belgium by the enemy, this report could only be considered an interim one, and it was obvious that the final report could only be sent in after the Germans had been driven out of Belgium. This end having been achieved, a new commission was appointed to study and report not only on the question as to the advisability of electrifying a part or the whole of the Belgian railway system, but also to investigate and report on the problem of unifying the supply of electricity for all purposes all over the country, having regard to the important position which the railways, if electrified, would occupy as consumers of electrical energy.

This commission held its first meeting on April 10, 1919, at the Ministry of Railways in Brussels, being presided over by Mr. Renkin, the minister who called the meeting. Baron Ancion was again appointed president of the commission, and Philip Dawson and Mr. Mazen, chief mechanical and electrical engineer French State Railways, were appointed the two vice-presidents.

As a result of the Brussels meetings, this commission has unanimously recommended that it will be of public utility to prepare immediately a scheme for the electrification of the Brussels-Antwerp line and of the lines in the immediate neighborhood of Brussels. It has also recommended that a definite scheme for this electrification should immediately be prepared by the engineers of the Belgian State Railways, and that as soon as it is ready a further meeting of the commission should be called to advise on the carrying out of the scheme.

The commission has also unanimously recommended that the first scheme should be prepared on the understanding that all the railways within, say, 40 miles of Brussels must, of necessity, be very shortly electrified, and that eventually electrifying the Brussels-Arlon line is advisable. As soon as the preliminaries in connection with these projects have been prepared, the commission will investigate the means for co-ordinating existing electric supply undertakings and erecting new super-power stations.

# N. E. L. A. Epitomizes Electric Power Situation

## Reports of Prime Movers, Electrical Apparatus and Underground Distribution Committees Presented at Atlantic City Convention This Week Are Abstracted

AS THIS issue of the ELECTRIC RAILWAY JOURNAL goes to press the National Electric Light Association is meeting in annual convention at Atntic City, N. J. Abstracts of committee reports dealg with power matters are given this week. In a later sue a summary of the convention as a whole will be ven.

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## tatus of the Steam Turbine and Tendencies in Design

The report of the committee on prime movers scusses various phases of the problem of selecting rbines with proper regard to the size of the system a whole, and includes information as to the ing records of large-sized turbines, together with atements submitted by manufacturers reviewing ogress during the past year. The development of ndensers, boilers, superheaters, stokers, economizers d power-station auxiliaries is covered in detail, and e wider use of boiler and turbine-room instruments recommended as a means of checking operating nditions. Storage and handling of coal are discussed d several of the newest installations are described. ention is made of the possibilities of the use of lverized fuel and lignites. Further discussion of e advantages and disadvantages of higher steam essures is included and brief reference is made to e proposed scheme of extracting by-products from w fuel before firing under boilers.

On the subject of water power there is a general scussion of development in this line during the past ar and the tendency to go to fewer and larger units noted. Improvements in details of general design e listed and the record of progress as submitted manufacturers is included.

In the gas field the production of fuel oil from rious fields in the United States is shown in tabulated rm and attention is directed to the fact that, while e development of Diesel engines has been mainly in e field of marine engineering, improved design fea res are being incorporated in engines of this type r land plants. Reference is made to the Bureau of ines Bulletin No. 156 for exhaustive investigation d reports on the Diesel engine.

### WHAT IS THE LIMIT IN TURBINE SIZE?

With the above outline of the prime movers' com ittee report as a whole in mind a few details may taken up for elaboration. During the past two ars there has been a marked increase in the number large turbine units in operation, particularly the rizontal, single-shaft type of approximately 30,000-v. capacity. It would appear that with the present nstructional problems of prevailing frequencies and eeds and the recognized factors of safety, efficiency d cost, the size of systems to-day will hardly warnt units of this type larger than 30,000-kw. capacity. Among the very large electric railway power plants the Interborough Rapid Transit Company, New York City, heads the list with a generating capacity of 389,000 kva. and a single unit of 70,000-kva. capacity. The Boston Elevated Railway has 122,500-kva. capacity and 35,000 kva. in a single unit. The corresponding figures for the Brooklyn Rapid Transit Company are 139,850 kva. and 30,000 kva.; those for the Pennsylvania Railroad, Long Island City, N. Y., are 78,000 kva. and 21,000 kva., and those for the New York Central Railroad, New York City and Yonkers, are 60,000 kva. and 20,000 kva. The Twin City Rapid Transit Company has a total capacity of 65,000 kva., with 20,000 kva. as the capacity of the largest unit. These examples are cited simply to show the present trend in generator capacity.

Continuity of service is an essential in the modern power plant and each company must decide for itself as to how far it is safe to go in the installation of large generating units. The fact is to be remembered, however, that certain of the large machines have records of continuous performance and output which surpass anything previously considered possible. For example, one 25,000-kw. unit operated at 67 per cent load factor during a fifty-one-day run without shutdown; another machine of the same size has completed two seventy-seven-day runs at 67 per cent load factor in one instance and 70 per cent in the other, while one of the 35,000-kw. units operated at 65 per cent load factor for a seventy-day run without shutdowns.

### WAR CONDITIONS WERE REFLECTED IN TURBINE TROUBLES

Some troubles have occurred in the operation of horizontal-type single units of 20,000-kw. capacity and above during the three years of experience with these machines. During this period, however, both manufacture and operation have been carried on under most adverse conditions as affecting labor and materials.

In analyzing the causes of trouble indicated by the operating records of these machines, it appears that labyrinth packings and thrust bearings have probably contributed to the major part of large turbine operating difficulties. While these troubles in themselves have caused a considerable loss in operating time, they have also been responsible in a number of instances for the development of more serious troubles, such as excessive vibration of parts, breaking of buckets, and dangerous rubbing of stationary and moving elements which in extreme cases have resulted in permanent deflection of shafts.

The most serious situation that has developed in the types and sizes of units under consideration, however, has been the number of quite recent turbine-wheel failures. In several instances these accidents have resulted in the complete wrecking of the units concerned. The situation is now a critical one and while any statement at this time would be premature the committee wishes to indicate the necessity for early action both in safeguarding against further possible failure of machines now in operation and in definitely reaching solutions of those problems which involve important features of design and construction.

In general, however, the records of operating performances of these larger-sized units, while too incomplete for definite conclusions, do indicate that there is every reason to expect as high a standard of performance for the recent types of large-capacity single-shaft units as the standard which had been attained in the operation of machines of earlier designs and smaller capacities.

### STAND-BY CAPACITY IS LESS NECESSARY THAN FORMERLY

The subject of "stand-by" or "floating" operation of a turbine, *i.e.*, running it at or near zero load, is of special interest to companies having steam plants connected to transmission systems normally fed by hydroelectric power. It appears that the operation of steam turbines with no load in parallel with hydroelectric systems is tending to become less frequent, not only on account of the necessity for rigid economy, but because hydroelectric plants and transmission lines are becoming more and more reliable. It is, in general, only for the most important load and with inferior hydroelectric system operation that this stand-by operation is advisable.

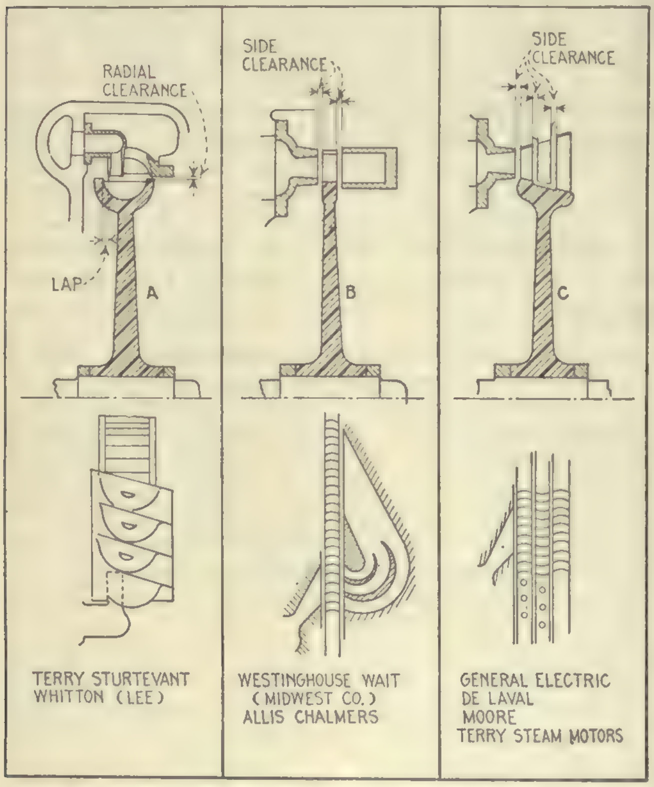

FIG. 1—DESIGN FEATURES OF VARIOUS CLASSES OF SMALL STEAM TURBINES

When the floating service becomes necessary, great care and skill should be exercised in keeping steam plant costs at a minimum; this is especially necessary with steam plants not specially designed for economy during stand-by operation, but even in stations planned specifically for such service, a considerable saving can usually be made by careful study of operating methods.

In an appendix to the section of the report dealing with steam turbines considerable attention is given to the small machine for driving power plant auxiliaries. The impulse principle is said to be used exclusively for all small machines, as the reaction or Parsons type is commercially impracticable below, say, 500 hp.

Four distinct types of machines are now extensively used, the principles of which are shown diagrammatically in Fig. 1. These are: (*A*) The helical flow type; (*B*) the single-wheel re-entering type; (*C*) the multi-wheel velocity stage type, and (*D*) a group which consists of multi-stage machines made up of several pressure stages incorporating one or more of the principles enumerated above, or using the straight Rateau principle having only one velocity stage per pressure stage. The operating characteristics of small turbines are illustrated in Fig. 2.

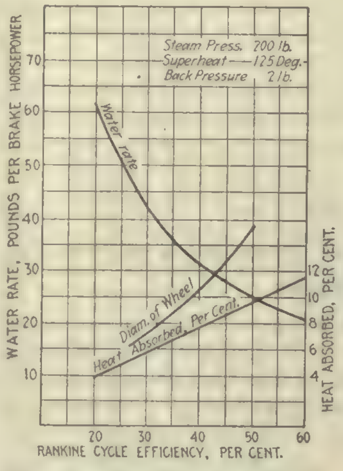

FIG. 2—OPERATING CHARACTERISTICS OF SMALL STEAM TURBINES

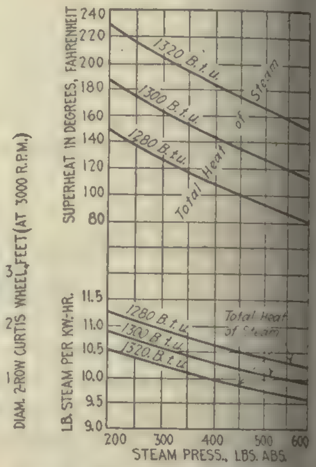

FIG. 3—WATER RATE OF 60,000-KW. TURBINE AS AFFECTED BY STEAM PRESSURE

### CONDENSER IMPROVEMENTS WERE LARGELY MECHANICAL

While the necessities of war have constrained condenser development to a certain extent there has, during the war period, been developed the steam air ejector.[1] The unqualified success of this device at sea has shown that it will occupy a prominent place in future condenser installations. Several firms are manufacturing air ejectors applicable to replace the present reciprocating or hydraulic air pumps.

In the installation of ejectors some caution must be used because the exhaust contains all of the air that has been pumped out of the condenser. It is not safe to discharge the steam and air from these ejectors into heaters of the present type. There should be installed a large surge tank into which the make-up and the discharge from the air ejectors is carried. The tank should have a free atmospheric vent for the discharge of the air, allowing the water from the tank to overflow into the heaters.

During the last two years a number of the larger condensers installed on General Electric turbines in power stations have been put on spring supports without expansion joints, and this method appears to be very satisfactory. The Westinghouse Company recommends hanging the condenser from the turbine foundation, which is also satisfactory as it accomplishes practically the same results as the springs. In one ce where the condenser was located 50 ft. below the rbine, and there was an unusual amount of expansion the exhaust piping, the expansion joint was of the mercury type.

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[1] A typical ejector was described in the issue of the ELECTRIC RAILWAY JOURNAL for March 16, 1918, page 538.

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## Boiler Room and Fuel Practice from the Conservation Standpoint

AMONG the topics considered by the committee most important for attention this year were some recent tendencies in connection (a) with boiler-setting design and baffle material, (b) with cleaning and other routine operations on boilers, (c) with superheater operation and (d) with feed-water regulator application.

In the use of insulating brick in boiler settings the mitations, if evident at all, occur in that portion the setting which is nearest the furnace or subject the highest furnace temperatures and consequently the greatest expansion and contraction strains. Operators feel that the furnace walls should be solid, well bonded and homogeneous.

There is a recent tendency toward building the furnace walls of solid firebrick. Until some more satisfactory refractory material is developed than those now available it may be necessary to depend to a certain extent on the radiation of heat through the furnace walls to cool and preserve the furnace lining. There has been some experimental work in progress regarding the materials used for baffles, and there seems to be a demand for a baffle which, compared with the usual type, is tighter and more readily renewable or repairable; one which can be placed at any desired angle with the tubes.

The problem of how to design the side and bridge walls of the boiler furnace so as to necessitate a satisfactory minimum of brickwork maintenance and boiler outages is one on which considerable progress has been made. The present-day demand is for a furnace lining which will withstand the high furnace temperatures and blow-torch action, the constant heating and cooling effects, and the abrasive action of the fuel bed.

Among the diversified means in use for preserving furnace linings the following may be mentioned: The use of ventilated walls; the use of special refractory materials; the application of steam jets along the grate on the side walls; the water cooling of ledge plates and water backs; the use of high-temperature cements.

### WHEN IS A BOILER OVERLOADED?

In recent large central station designs maximum boiler ratings of from 250 per cent to 400 per cent have been used. The tendency toward higher boiler ratings has led operators to feel that boilers in general should be operated at much higher ratings than in the past. This is a justifiable conclusion if not carried too far.

A boiler is often spoken of as being overloaded when in reality it is the stoker which is being forced beyond its proper limits. Generally speaking, the capacity which can be developed by a boiler and stoker unit is limited only by the amount of coal which can be burned by the stoker equipment. The capacity of the boiler is mainly a question of how high a flue temperature may be tolerated. A restraining influence on the maximum possible rating is the fact that the boiler and stoker must be designed to operate at maximum efficiency over as wide a range as possible.

The problem of draft loss at high boiler rating is an important one. Sometimes users of underfeed stokers are disappointed in the capacity of their boiler installations due to the fact that the stack or fan does not provide sufficient draft to take away the gases from the furnace. The character of the boiler feed water also may readily become a limiting factor in the boiler rating developed. As a general proposition extremely high boiler ratings are desirable only in connection with plants equipped with surface condensers.

From information received by the committee from some of the largest stations in the country, it appears that the normal and maximum forcing rates for boilers average 140 per cent and 200 per cent respectively. The highest boiler ratings available are used in the estimates for steaming capacity during the annual peak load periods which may be of limited duration.

### SOOT BLOWERS ARE INCREASINGLY POPULAR

There is a general movement toward the use of mechanical soot blowers in cleaning external heating surfaces in boilers. Properly selected soot-blowing equipment makes a highly profitable investment notwithstanding the fact that this apparatus is not regarded as being wholly satisfactory under severe operating conditions. Where fairly high boiler ratings are developed some trouble is encountered in maintaining the soot-blower elements located nearest the furnace, regardless of type of construction used, and care is necessary to locate these elements so that they will not be subjected to a destructive heat.

Recent labor conditions have turned the attention of operators toward the subject of feed-water regulators with the result that for average boiler plant conditions and for plants containing more than three or four boiler units, a wise selection of feed-water regulators may now be regarded as standard practice. Generally speaking, the most satisfactory type is one which does not aim at a constant water level but which takes advantage of permissible variations to aid in caring for fluctuating steam demands on the boiler. With the advent of modern boiler plant improvements and the higher grade of labor necessary to maintain and use them properly, operators do not regard the necessary care and maintenance of feed-water regulators as being as much of a burden as heretofore.

### THE SUPERHEATER NEEDS REGULAR ATTENTION

The matter of relative attention given to boilers and superheaters is one which deserves mention. The superheater is frequently overlooked by the boiler-cleaning and repair crew because it seldom needs cleaning or repairs. It should be as carefully inspected and watched as any other portion of the boiler.

The question of pressure drop through superheaters is one which frequently causes operators some little concern. A superheater is necessarily designed to produce a certain amount of pressure loss at low rating, otherwise the steam might short-circuit through the nearest tubes and permit the farthest ones to become burned. Superheaters are usually designed to operate at rated boiler capacity with from ½ to 1½ lb. pressure loss. Since the pressure loss increases as the square of the velocity a 1-lb. loss at rating would mean a 4-lb. loss at 200 per cent rating and a 9-lb. loss at 300 per cent rating.

A superheater as such is a very efficient piece of apparatus, but as a boiler or evaporator it not only becomes a source of loss through loss of superheat but may be the cause of high maintenance cost as well. At 200 lb. pressure and 100 deg. superheat 1 per cent of moisture in the steam entering the superheater causes a loss of 17 deg. of superheat. As a result of a questionnaire on superheater practice it appears that the superheater continues to be an adjunct fitted to a more or less inflexible design of boiler and there should be a closer co-ordination of superheater design with boiler design.

### GETTING RID OF ASHES AND CLINKER

On the matter of stokers and grates the committee feels that the most important developments in the underfeed type of stokers are the power dump grates and the clinker grinders. Of these the latter is more important.

Besides the grinder developed by the manufacturers several companies have installed grinders of more or less special design. It is essential in these installations to provide sufficient depth of ash above the grinder to protect it from the hot clinkers, and so to proportion the opening leading down to the grinder that clinkers will not bridge across this opening and prevent the ash from getting down to the grinder.

The forced-draft type of chain grate is being used more extensively than heretofore and has been successfully used in burning low-grade fuels high in ash.

There is an increasing tendency to sectionalize stoker drive on underfeed stokers. On some recent installations consisting of thirteen retort stokers the stoker was divided into four sections each driven by its own motor. By sectionalizing the stoker drive the operating force can maintain a more uniform thickness of fire across the stoker.

### A PASSING WORD ON THE ECONOMIZER

In the economizer field progress has been made during the past three years in the development of types for pressures of 300 lb. or higher, using extra heavy cast-iron or "semi-steel" tubes and improved designs for headers, joints and other details. A few high-pressure steel economizers are in use in this country and a large number abroad. With the higher cost of fuel, economizers will doubtless come into much wider use. It is impossible to make any general statement concerning the advisability of installing economizers in connection with a boiler plant; each case has to be considered by itself, taking into account all factors, such as cost of fuel, cost of economizers and especially the load factor under which the boiler plant is to operate.

### ECONOMICS OF POWER STATION AUXILIARY SELECTION

The increasing price of fuel and the determined conservation drive during the war have been responsible for considerable improvement in the application of basic underlying principles to power station auxiliaries. After due consideration has been given to required reliability and reserve capacity the auxiliary problem resolves itself into one of maintaining steam balance on varying load with the maximum possible auxiliary brake-horsepower from exhaust steam discharging to heater.

The smallest thermal cost for auxiliary power is expended when steam auxiliaries having a minimum consumption per brake-horsepower are used up to the limit of feed water and absorption capacity and the balance of auxiliary power required is taken from the main busbars.

The fundamental principles have been applied according to the following general scheme: (1) Dual system, which is part steam and part electric, with duplicate circulating-water equipment, or pumps equipped with induction-motor drive on one end and steam turbine with variable-speed governor on opposite end to control proportion of power by steam. (2) Straight electric drive from the main unit, bleeding the intermediate stages of the main prime mover for steam to heat the feed water. (3) Straight steam drive, using all steam possible to heat feed water, the balance being fed to the low-pressure stages of the main prime mover. (4) Straight electric drive with house turbines, as much of the auxiliary load as possible being carried on a comparatively large turbine exhausting to the condenser heater, the balance being carried on the main prime mover.

Among other topics taken up by the committee with respect to the operation of the power plant proper, the following particularly deserve mention:

First as to exciter drive, the larger units are generally equipped with direct-connected exciters, whereas the smaller plants employ motor drive for use in connection with voltage regulators. Steam-driven exciters are very generally used for stand-by only.

The majority of plants still prefer the open type of heater on account of the better elimination of entrained air and gas in the condensate and make-up. However, the elimination of oil seems to be the deciding factor in favor of closed heaters where used.

In stoker fans a decided improvement has recently been made in the efficiency of fans over a wide range of loads, and they are well adapted for either motor or steam drive. The selection of type of drive is largely a matter of heat balance.

Boiler feed pumps are generally made turbine-driven, with the differential pressure governor to maintain a predetermined relation between the water and steam pressures. It is generally found necessary or desirable to maintain some automatically controlled differential pressure, particularly when used on a system with automatic feed-water regulators.

In general steam auxiliary specifications call for operation at full capacity with a maximum drop of about 50 lb. in steam pressure. Electric auxiliaries are usually specified to operate on 10 per cent voltage variation in either direction.

### SAFEGUARDING COAL IN STORAGE

Coal storage is given careful attention in the committee report this year. With reference to storage it is pointed out that coal does not deteriorate seriously unless it heats sufficiently to fire in some part of the pile. Furthermore, if a pile fires in one or more places all of the coal in the immediate neighborhood of the fire is absolutely ruined as far as gas and coke-making is concerned, although it can still be used as fuel for boilers.

For the prevention of spontaneous combustion the following remedies have been successfully tried: (1) The exclusion of air, which can be attained by storing under water, storing in airtight bunkers or storing a mixture of sizes so proportioned that the air spaces between the lumps are completely filled, successive layers of coal being further tamped to eliminate air spaces; (2) storage in piles small enough in size to allow the heat to be radiated as fast as formed; (3) provision of sufficient ventilation to carry away the heat of combustion by storing only lump coal which offers sufficient air passage through the pile to cool the coal, or by installing a system of ventilating ducts carrying air to all parts of the pile to remove the heat as formed.

### OPERATING THE BOILER PLANT FOR HIGH EFFICIENCY

In the last two or three years great advance has been made in the development of $CO_2$ recording machines, but these are still far from ideal for firemen's use.

The principle of the $CO_2$ recorder is excellent in that it gives a direct measure of air required to utilize the utmost heat value of the fuel, and gives therefore an indication of the most efficient combustion. But good over-all efficiency does not necessarily follow from good combustion efficiency, since it is affected by the condition of the surfaces of the boiler. As an indication of this condition it is necessary to use a flue thermometer in conjunction with the $CO_2$ recorder.

In boiler operation it is desired to have information in regard to the flow of air, and many methods have been devised for measuring this. In some cases it has been determined by means of pitot tubes and in some cases by orifices in the pass to the air chamber, and in still others by using the boiler setting as an orifice. The method of boiler operation utilizing steam-flow and air-flow meters and flue thermometers offers a most promising solution to the question of boiler operation at the present time. If it is perfected to a greater degree it will develop the principle of the remote control of boilers. We are entering into a period when one man will operate all the boilers from a central point.

The steam-flow meter has progressed greatly since the last report of the committee, and its accuracy as now designed can be maintained within 2 per cent. These meters may be depended upon for a perfect indication for the boiler room and may also be used in many cases for the sale of steam.

### SOME THINGS A WELL-EQUIPPED BOILER ROOM CONTAINS

Coming now to a discussion of the over-all efficiency of the boiler plant, it may be noted that the instruments used have progressed in proportion with those used for individual boiler operation. Very suitable meters have been designed for measuring the feed water supplied to the boiler; also meters for measuring water that is drawn from the boiler in the form of blow down. Furthermore, recording automatic scales have been developed for recording the weight of coal passing over belt conveyors or through hoppers, so that it is possible to run continuous over-all boiler-room tests.

Automatic instruments for measuring coal, however, have not reached the stage of perfection which could be desired, as in order to keep them reasonably accurate they must be continually adjusted. For this reason many plants equipped with the modern boiler of increased size are using the coal larry with the well-known platform scales.

Recording thermometers are coming into more extensive use in various parts of the plant. The installation of economizers calls for the employment of these and they have proved accurate and essential for efficient operation at this point.

As a matter of fact, regarding all turbine and boiler-room instruments, the recording type is becoming popular and shows good results from the point of view of decreased cost of operation of the plant.

## Progress in Producing and Transmitting Electric Power

The report of the committee on electrical apparatus this year covers particularly the control of fires in generators, some special phases of switchboard and transformer practice, substations with special reference to outdoor substations and automatic substations, power factor correction, and apparatus for special fields, including electric furnaces, welding and the mining field.

The committee points out that the rapid increase in the use of very large generator units brings with it the necessity for satisfactory means for protecting them from the effects of external trouble and for provisions to minimize the effects of internal troubles. Increased attention is now being given to relay protection of a nature promptly to disconnect a unit which has failed, and also to fire extinguishing equipment which will minimize the damage from a generator breakdown, if this results in burning.

In connection with fires originating within the generator shell of turbo-generators of the inclosed type, the problems are to determine means of minimizing the occurrence of such fires, to limit the extent of the damage, and to provide effective fire-fighting equipment.

### CLEANLINESS IS ESSENTIAL IN THE OPERATION OF GENERATORS

In preventing fires, the inspection and cleaning of generators at more frequent intervals seem to be very desirable, and every precaution should be taken to limit the amount of dirt and oil which may enter the generator. Many companies have standardized on the installation of air washers. As to frequency of inspection and cleaning it would appear to be desirable to clean machines at least once a year. The use of additional insulation on armature coils of generators is reported as having reduced fire hazard, and the grounding of the neutral of the three-phase system solidly or through resistance is rapidly becoming standard practice.

In the line of protective equipment it is also becoming standard practice for manufacturers to bring out both ends of each phase winding of an armature to the generator terminal board so as to permit the installation of current transformers to operate protective relays. Many companies approve the installation of balanced relay protection and have adopted it as standard practice on all new generator installations and on older generators where the expense involved is not too great. The field switch is usually opened by means of an auxiliary switch on the main oil switch or by an auxiliary relay, so that there will be no chance of the field being opened before the armature has been disconnected from the system. Balanced relay protection is preferred to reverse power protection because the installation of reverse power relays is somewhat complicated in comparison with the very simple connections for balanced relay protection.

### PUTTING OUT A GENERATOR FIRE

In the methods thus far adopted for extinguishing electrical fires, water, steam and carbon tetrachloride have been used. Water and steam are looked upon at present with favor.

For the ready application of water to the generator winding the usual practice is to provide pipe rings which are fastened at each end of the generator inside the end bells. Perforations are located in these pipes so as to throw a fine spray of water over the entire windings and over the air gaps.

In applying steam to generator windings two plans are used: (1) Steam pipe is arranged inside the end bells, perforated so that numerous jets will impinge directly on the end portion of the windings and into the air gap as in the case of water. (2) Perforated steam pipe is located in the air inlet of the generator.

It will be necessary after applying water to the generator windings to dry them out before placing them in operation again. Experience has demonstrated that generators may be sprayed with water for some time with no serious damage if they are thoroughly dried out before being again placed in commission.

The practice of installing some form of permanent fire-extinguishing equipment is gaining headway.

### OTHER HIGH SPOTS IN ELECTRICAL POWER PLANT EQUIPMENT PROGRESS

The sub-committee on switchboards reported that active steps have been taken during the past few years to put the matter of capacity rating of switches on a more logical and uniform basis. It pointed out that air break switches should be rated very liberally with regard to current-carrying capacity on account of their rapid deterioration resulting from high temperatures.

The sub-committee showed pictures of an automatic air disconnective switch for use with oil circuit breakers. This opens slightly after the contacts in oil have opened and on closing makes contacts slightly in advance of the contacts in oil. The development was prompted by a desire to obviate the accidents such as have occurred all over the country with the manually-operated disconnective switches.

The sub-committee on transformers this year revised its booklet on transformer standards. It has worked in co-operation with a similar committee of the Electric Power Club, representing the manufacturers, with resulting co-ordination in efforts of operating companies and manufacturers toward perfecting standards acceptable to all interests involved.

### POSSIBILITIES OF AUTOMATIC CONTROL ARE RECOGNIZED

While the report of the sub-committee on substations is largely taken up with substations of the industrial type, automatic control also received attention.

With respect to overload protection it is stated that practice varies widely. Many companies protect the entire substation with oil circuit breakers and some with fuses, with no selective overload protection for individual units; while others in addition use fuses with individual transformers. One company uses an automatic high-voltage air circuit breaker with overload trip coils on each pole of the switch to protect the entire substation. One company uses no overload protection of any description on the high-voltage side of 11,000-volt, 22,000-volt or higher-voltage substations, treating the transformer as part of the line. The overload protection is provided usually in the form of an automatic oil circuit breaker on the low-tension side.

The sub-committee calls attention to the fact that while seven direct-current railway substations of 1000-kw. capacity and above, and more than thirty between 300-kw. and 600-kw. capacity, have been in automatic operation for some time (not including one 3000-kva. synchronous condenser and one 1500-kw. hydroelectric generating plant which operate entirely automatically) only one lighting company reports substations operating semi-automatically on 115- to 230-volt direct-current networks. However, in reply to a questionnaire query "If you have no alternating-current or direct-current substations in operation do you consider the idea practicable as applied to modern capacity substations?" almost without exception the answers were in the affirmative.

Two companies report that they are experimenting with an automatic reclosing oil circuit-breaker arrangement on feeder circuits. A third company has a small capacity transformer indoor type distributing substation with induction feeder regulators and automatic reclosing oil circuit breakers. These breakers are provided with special control relay equipment designed to reclose the circuit breaker immediately after it opens on overload. Should the circuit breaker reopen it will be again closed for a total of three operations all within a few seconds. After three such operations the main control relay opens the circuit of the closing coil of the circuit breaker and thereafter it is necessary to close it by hand. There have been no complaints from consumers on account of the rapidity with which the circuit is reclosed.

The sub-committee gives careful attention to the subject of power factor correction which is becoming increasingly important on account of the growth of certain kinds of central station loads which have inherently low power factor. As most electric railway load on the alternating-current side consists of synchronous converters it will not be necessary to go into details of this phase of the report.

### LABOR-SAVING DEVICES IN CONDUIT CONSTRUCTION

In the field of underground distribution the committee on this subject finds that a marked change has occurred in the load curve of central station companies due to their taking on large blocks of load to serve industries working on a 24-hour basis. All classes of equipment have therefore been obliged to operate as a higher load factor than before. The result has been an unusually large number of cable failures, with the resulting necessity for careful attention to the matter of rating cable capacity.

In the line of artificial cooling of ducts little development work appears to have been done, although it is usually possible to obtain relief in case local hot spots develop by means of some sort of artificial cooling. More attention is being given to dielectric losses in cables with a view to minimizing this loss.

# The Zone Fare in Practice

BY WALTER JACKSON

## BELFAST—Part II

### How Two Successful Fare Increases Were Worked Out on Scientific Basis and the Net Surplus Was More Than Quadrupled—Fares Are Easily Collected and Accounted For with Zone-Numbered Tickets

THE first half of this article, published in the ELECTRIC RAILWAY JOURNAL of May 10, 1919, alluded to successful fare increases made by the Belfast City Tramways. How these were accomplished will now be indicated. Prior to May, 1917, the penny fare was almost universal in Belfast, and only a few long rides cost 2d. Beginning April 7, 1917, J. S. D. Moffet, general manager, presented to the city a series of reports covering a graded-fare plan. Eventually a schedule was accepted whereby about ½ mile was cut off the original penny stages and 1½d., 2d. and 2½d. stages were introduced. The first series of changes, on May 21, 1917, proved a great success, particularly the 1½d. stage, as the accounts for the fiscal year ended March 31, 1918, prove. Further heavy burdens, however, in the shape of increased war bonuses and greatly inflated prices of materials made it necessary in May, 1918, to consider a second revision of fares in which it was imperative to aim at the general principle of giving not more than a 1-mile ride for 1d. Additional reports, therefore, were presented about the end of that month. These reports furnished fuel for heated discussion and eventually (July 1, 1918) resulted in the adoption of an "end-on" 1d. per mile (actually 1⅛-mile on the average) scheme, with one 1½d. stage from Castle Junction (the central point) on each section.

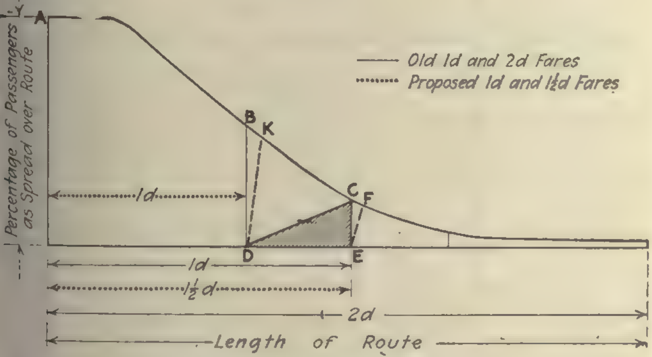

A
B
K
C
F
D
E
Old 1d and 2d Fares
Proposed 1d and 1½d Fares
Percentage of Passengers as Spread over Route
1d
1d
1½d
2d
Length of Route

FIG. 1—THE EFFECT OF INCREASING FARES AND REDUCING STAGES IN BELFAST

1. Hatched triangle C D E shows portion of penny passengers converted to 2d. passengers if 1d. stage were reduced in length from *E* to *D*.
2. Triangle K C D shows portion of penny passengers from which extra revenue might be derived if 1½d. stage were introduced. Area C F E D shows the portion of 2d. passengers from which revenue would be lost if a 1½d. stage were introduced.

BELFAST CITY HALL

This revision also has been remarkably successful, as the following comparative figures for the nine months ended Dec. 31, 1917 and 1918, show:

| | Dec. 31, 1918 | Dec. 31, 1917 |
|---|---|---|
| Revenue | £324,000 | £260,000 |
| Expenditure | 203,000 | 164,000 |
| Net surplus | 32,000 | 7,000 |

The table on page 1010 shows the division of passengers, according to fares paid, for the weeks ended Nov. 17, 1916, Nov. 16, 1917 and Nov. 15, 1918. The figures given certainly indicate that the fares were increased without decreasing the riding. It will be observed,

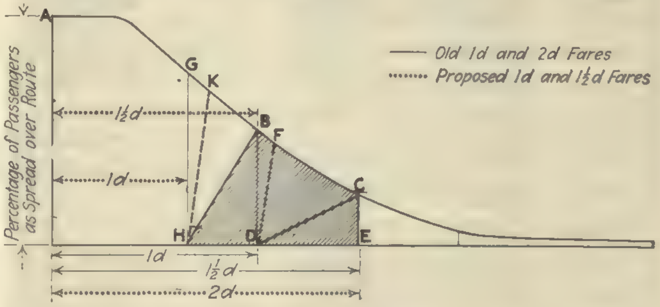
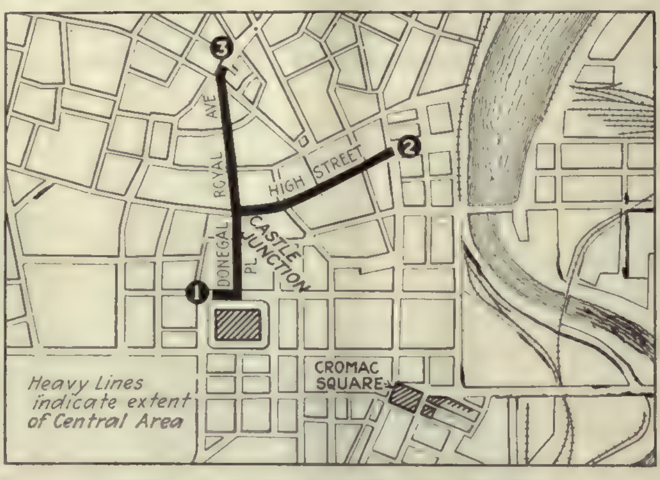

A
G
K
B
F
C
H
D
E
Old 1d and 2d Fares
Proposed 1d and 1½d Fares
Percentage of Passengers as Spread over Route
1½d
1d
1d
1½d
2d

FIG. 2—THE EFFECT OF A FURTHER REDUCTION IN LENGTH OF 1D. STAGE AS SHOWN IN FIG. 1

3. Area B H D E C shows portion of 1d. and 1½d. fares converted to 2d. passengers if 1d. stage were still further reduced in length from *D* to *H* and 1½d. stage abolished.
4. Triangle K B H shows portion of penny passengers from which extra revenue might be derived and area B F D H the portion of 2d. passengers from which revenue would be lost if a 1½d. stage were introduced.

especially, that 20.6 per cent of the travel is made up of 1½d. passengers who formerly paid 1d., and that enough old 1d. passengers are now paying 2d. to raise the ratio of 2d. passengers from 6 per cent to 16.3 per cent of the total passengers carried. Had it been possible to give all the car-mileage desired, the travel would have been still better.

Preliminary to introducing the 1½d. Mr. Moffet made graphical studies such as those shown in Figs. 1 and 2, which are reproduced merely to suggest his general plan without going into details. In these he determined (1) the effect of converting a given number of penny passengers to 2d. passengers if the penny stage were shortened in the proportion shown; (2) the effect of converting a given number of penny passengers into 1½d. passengers as compared with the number of the 2d. passengers that would be lost thereby; (3) the portion of 1d. and 1½d. passengers converted to 2d. passengers if the 1d. stage were still further shortened and the 1½d. fare abolished, and (4) the portion of 1d. passengers from which extra revenue might be derived compared with the portion of 2d. passengers from which revenue would be lost if a 1½d. stage were introduced.



CENTRAL OVERLAP AREA IN BELFAST

In general, Fig. 1 was made to prove that people will not pay more for a ride—when it is not a necessity but a convenience—if they think it is cheaper to walk. Fig. 2 shows the dangerous condition that might arise if the losses exceeded the gains. As in the case of the American passenger, psychology must be reckoned with. The long rider who is asked to pay 4d. instead of 3d. is less disturbed than the short rider who is asked to pay 2d. instead of 1d., because the latter sees riding as a convenience or even a "luxury" (to use Mr. Moffet's term) with which he can dispense if he so desires. Although Mr. Moffet, when dealing with the second revision of fares, gave a detailed list of stages and their lengths, he also prepared a diagram to show any inequalities. This diagram, as reproduced in Fig. 3, calls for no lengthy explanation. Along the top line are set out distances up to 5½ miles, with the ½-mile points also shown. Down the left-hand margin of the diagram the various routes are tabulated together with the stages. The stages from the city center appear at the top in every instance, and the others follow consecutively. From left to right there are six columns. Those containing solid lines (black in original), namely, the first, third, fifth and six (half-size) columns, represent 1d., 2d., 3d. and 4d. stages respectively. Those containing

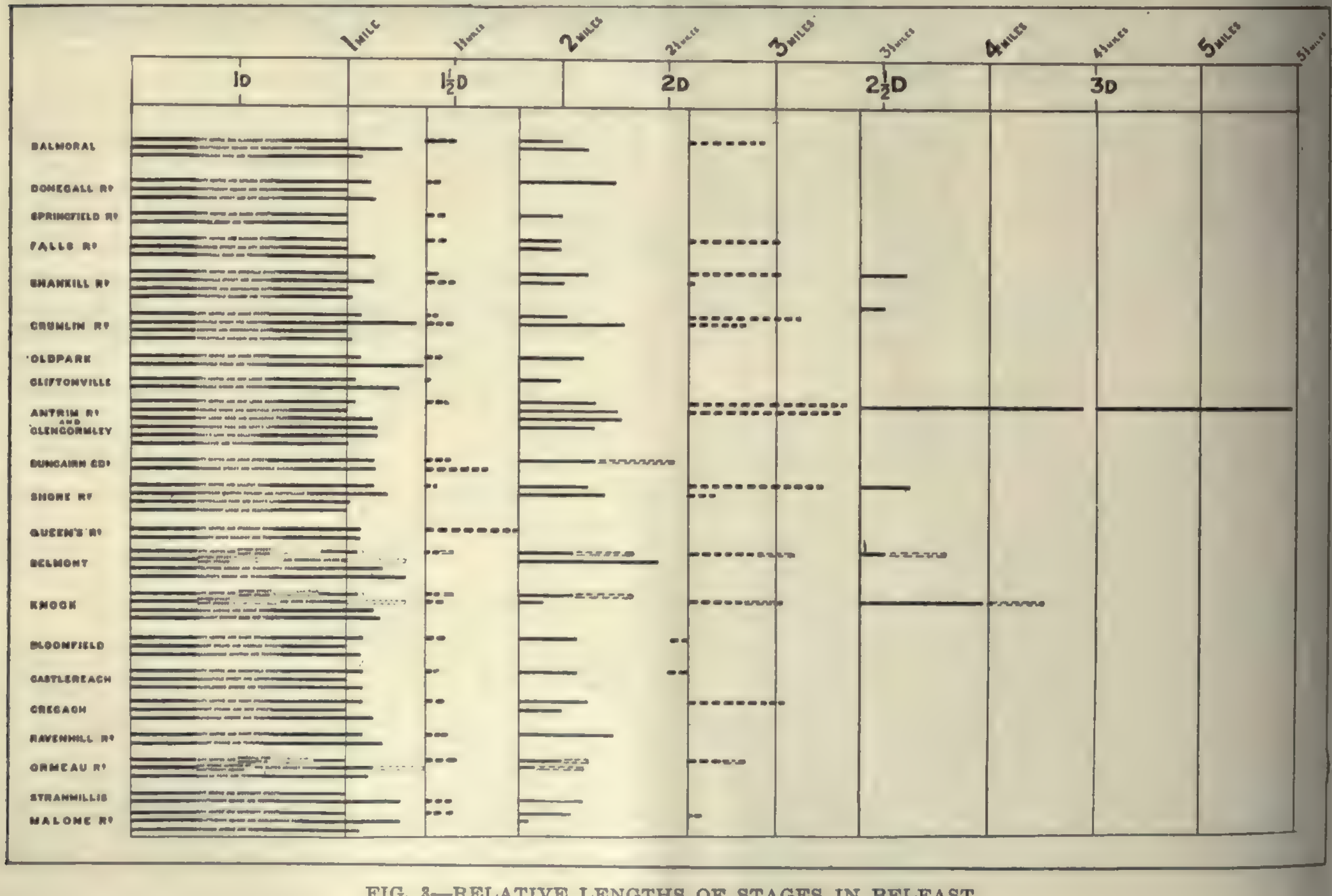


FIG. 3—RELATIVE LENGTHS OF STAGES IN BELFAST

broken lines (red in original), namely the second and fourth columns, represent 1½d. and 2½d. stages. The dotted lines show the difference in length of stage common to alternative routes, the full lines showing the length via the more direct route and the dotted line that via the longer route.

Of the group of 1d. routes between the mile (5280 ft.) and 7200 ft., the majority are well within 6000 ft. The 1½d. stages run between 7200 ft. and 9480 ft.; the 2d. stages, between 9480 ft. and 13,680 ft.; the 2½d. stages, between 13,680 ft. and 18,000 ft. and the 3d. stages between 18,000 ft. and 24,000 ft.; the only 4d. stage is 28,380 ft. long.

In one of the 1918 reports on the fare question, Mr. Moffet concluded with the following significant statement showing that electric railway men in the United Kingdom do not look upon the zone system as a hard and fast proposition but as something that must be worked out in accordance with the conditions peculiar to a given community:

> It has been suggested that stages should be fixed upon an exact mathematical basis of 1 mile for 1d., but such a proposition . . . is not a practical one, and therefore not one that I could recommend, as it would debar or prohibit my bringing to bear on the subject any skill, knowledge or experience which I may possess in such matters.

LOOKING ACROSS CASTLE JUNCTION, THE BUSIEST SECTION OF BELFAST

Moreover, in connection with a proposal to make a traffic point at Cromac Square ⅜ mile or less than 2100 ft. from the center, the general manager reported:

> Cromac Square is too near the city center. During the rush hours and meal times cars arrive at this point with practically as many passengers as they can hold, and they leave quite full. Consequently, there would be no advantage in fixing a stage there to encourage additional traffic which could not be accommodated. The fact that the cars still leave this point at such times loaded up to their fullest extent proves that the new fares have not stopped the wareroom and shop girls, or at least those who did ride, from traveling as before.
>
> Penny stages cannot be made from Cromac Square without reducing the fares below what they were before the Council decided to raise them. Moreover, corresponding overlapping stages which could not be refused would be demanded on all other routes, with the result that the whole business would be reduced to a huge farce.
>
> With regard to overlapping stages generally, I am of the opinion from my experience with such stages that in no case should they be fixed nearer than ⅝ to ¾ mile from the center.

There is now established in Belfast a central area of approximately 1140 ft. radius in which riders from one side of the city are permitted to board or leave the cars before or after they pass through Castle Junction. This gives an overlap area through the business section of the city. In order to enable the conductor to collect all his fares within so small an area and to avoid congestion, the railway has established three loading points besides Castle Junction at the following places (see accompanying map): (1) City Hall; (2) Albert Memorial, and (3) North Street. The central area shown on the accompanying may covers the triple-armed section, about 960 ft. along Donegall Place, 1140 ft. along Royal Avenue and 1320 ft. along High Street.

### SPECIAL FARES AND DISTRIBUTION OF RIDERS

In addition to the standard fares, the following special low-rate fares are in vogue for children and workmen:

#### CHILDREN'S FARES

1d. stage for ½d. through special ticket.

1½d. and 2d. stages through purchase of regular 1d. ticket, which is punched for the permissible additional number of stages.

2½d. and 3d. stages through purchase of regular 1½d. ticket, which is punched for the permissible additional number of stages.

4d. stages through purchase of regular 2d. ticket, which is punched for the permissible additional number of stages.

#### WORKPEOPLE'S FARES

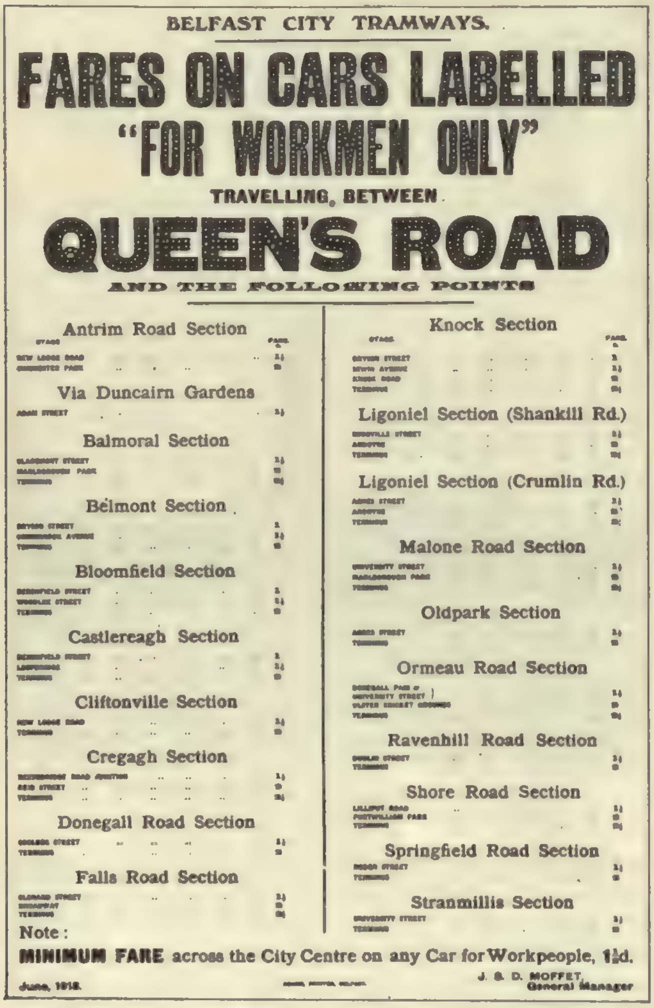
1d., 1½d. and 2d. tickets are obtainable for 1d., 1½d. and 2d. stages, for 2½d. and 3d. stages and for 4d. stages respectively, with a minimum fare of 1½d. across the city center on special through cars.

JUNCTION OF CLIFTONVILLE AND ANTRIM ROAD SECTIONS NEAR CENTER OF CITY

Workmen's roundtrip tickets are not used at Belfast. Workpeople's fares in theory are available, for example between 5 and 8 a.m. on cars labeled "For Workmen Only" but not different from standard cars in equipment or upholstery. As a matter of fact the actual workmen's morning traffic is from 5 a. m. to 6.30 a. m. during which period anyone who boards the cars buys a regular ticket and gets the additional riding as in the case of children's tickets. These early cars go direct to the shipyards via Castle Junction, as explained in Part I in the issue of May 10 in connection with rush-hour through-routing in Belfast. Between 6.30 and 7 a.m. no workmen's cars at all are run, as the cars are returned to the depots immediately after being unloaded at the yards. This class of riding, naturally, is too costly to be encouraged. At present, it is about 7.8 per cent of the traffic, and with the shorter workday may disappear altogether.

On the Glengormley line the management is trying to reserve the through cars for through passengers during rush hours by charging a minimum fare of 2d., somewhat as the Jacksonville (Fla.) Traction Company tried to keep short riders off the cars to Camp Johnston. The result of the Belfast experiment to date has been contrary to the expectation that there would be an increase in the revenue from this plan. A recent weekday showed that while the 2d. fares had increased from 517 to 768—a gain of 502d.—the penny passengers had dropped from 1138 to 567—a loss of 571d.—making a net loss of 69d. The increase in 2d. passengers was caused, of course, by the reservation of accommodation for this class of passenger, while the decrease in penny riders might be due to a greater choice of cars from the city than to the city.

There is little free riding in Belfast. At one time city employees rode at very low rates, but Mr. Moffet argued successfully that it was no more logical for the tramways department to carry these employees practically free than it would be for the electricity department to give electricity to the street railway. Except for some charity concessions, as to the blind, free riding on the Belfast lines is confined to tramway employees "to and from work or when on duty." For this purpose, they are furnished with a vivid red porcelain disk, duly numbered, which is worn like a wrist watch! Colored tokens of celluloid are sold for postmen and others at full price in lots of say £5.



BELFAST CITY TRAMWAYS.

FARES ON CARS LABELLED "FOR WORKMEN ONLY"

TRAVELLING BETWEEN

QUEEN'S ROAD

AND THE FOLLOWING POINTS

Antrim Road Section

Via Duncairn Gardens

Balmoral Section

Belmont Section

Bloomfield Section

Castlereagh Section

Cliftonville Section

Cregagh Section

Donegall Road Section

Falls Road Section

Knock Section

Ligoniel Section (Shankill Rd.)

Ligoniel Section (Crumlin Rd.)

Malone Road Section

Oldpark Section

Ormeau Road Section

Ravenhill Road Section

Shore Road Section

Springfield Road Section

Stranmillis Section

Note:

**MINIMUM FARE** across the City Centre on any Car for Workpeople, 1½d.

June, 1918.

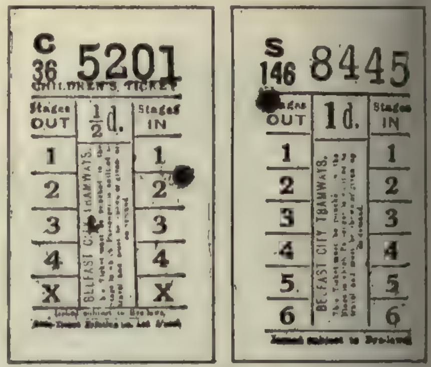
J. S. D. MOFFET,
General Manager

TELLING WHAT TRAVEL ON "WORKMEN ONLY" CARS WILL COST

Unlike the usual fare receipt, the Belfast tickets show the stages by numbers instead of names. By printing the maximum number of stages on a ticket of given denomination, the railway can use the same ticket on all lines where the given rate of fare prevails. The management, after many years' experience with this system in London and the Provinces, finds that the great mass of riders soon become familiar with the stage numbers on their every-day routes, while the stranger suffers no special inconvenience because it would be only a matter of chance that his destination was a stage boundary. In any event, there is no reason why the stage numbers, with the cheapest ticket numbering most prominent, could not be put on the poles if such identification was considered to be desirable. The tickets, two of which are illustrated, are similar to those which Mr. Moffet and his special traffic assistant, W. T. Young, introduced when they were operating the West Ham Corporation Tramways. In addition to the usual serial number the tickets have so-called "service" numbers which identify the conductors more readily than would otherwise be possible.

The method of fare collection is that usual with the ticket system.

The punches now being introduced are the latest type of the Ticket Punch & Register Company, Ltd., London, and these are rented at about $2.75 a year. With these punches, no registration can be effected without a standard thickness of ticket. To get at the punchings, it would be necessary for the conductor to destroy a tiny seal. Dishonest conductors are prosecuted but are fined rather than imprisoned. Compared with the citizens of other cities, those of Belfast appear to be well supplied with silver—too well supplied—as not more than 40 per cent of the passengers tender the exact copper fare. Disputes concerning the fare to be paid are not likely, for the rates are plainly displayed on posters, such as one for workmen's fares reproduced herewith. The traffic by-laws and regulations are also printed in a tiny red book carried in every car—more, however, as a matter of compliance with the law than as a matter of necessity.



SPECIMENS OF STAGE-NUMBERED AND SERVICE-NUMBERED TICKETS USED IN BELFAST

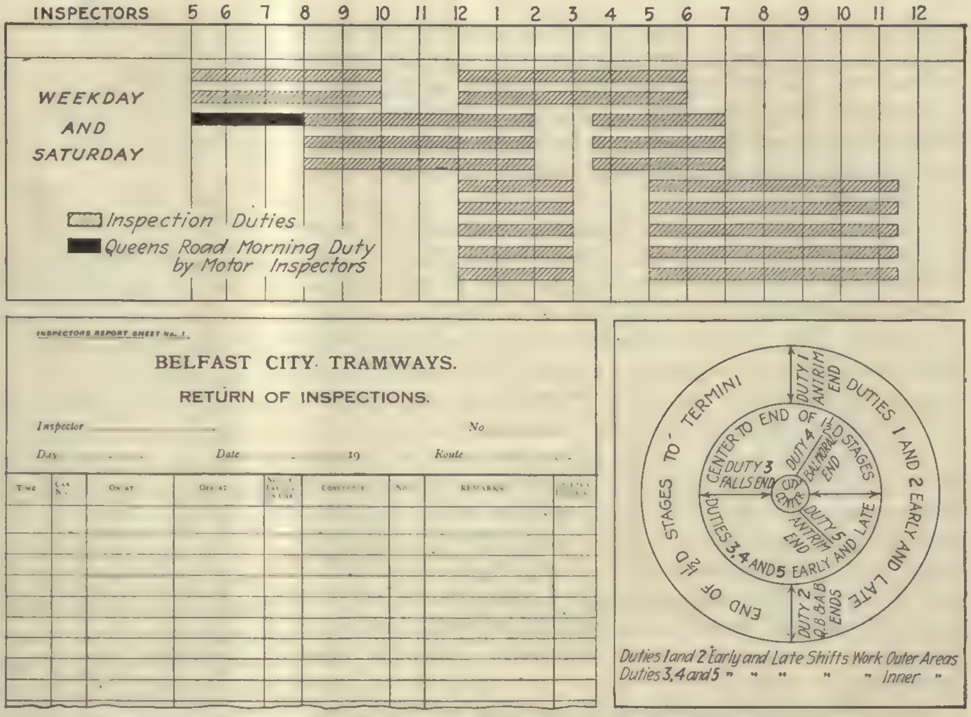
Ten ticket inspectors are employed. With the coming of the present management, the work of these men was systematized and definite report forms were introduced. This raised the number of checkings from less than 2000 to 10,000 per month. The inspector makes his report on the "Return of Inspections" sheet illustrated in Fig. 4, each report as to car boarded being initialed by the conductor. From these reports, the traffic department prepares two abstracts (daily and monthly), one showing the number of inspections per car and the other the number of inspections per conductor. These reports show from one to nine checks a day with an average of three to four for the system as a whole.

The work of the ten ticket inspectors is laid out according to Fig. 4 and the accompanying table, from which it will be seen that their duties or shifts are varied according to traffic conditions:

TIMETABLE OF TICKET INSPECTORS

Between 5 and 8 a.m., three are on duty.
Between 8 and 10 a.m., five are on duty.
Between 10 a.m. and 12 noon, three are on duty.
Between 12 noon and 2 p.m., ten are on duty.
Between 2 and 3 p.m., seven are on duty.
Between 3 and 3.30 p.m., two are on duty.
Between 3.30 and 5 p.m., five are on duty.
Between 5 and 6 p.m., ten are on duty.
Between 6 an 7 p.m., eight are on duty.
Between 7 and 10.30-11 p.m., five are on duty.

At the start of the day's work, each inspector (identified by duty number) is assigned a certain starting point, one group working around on an inner radius and the other group working around on an outer radius as shown in Fig. 4. There is considerable rivalry among the ticket inspectors, for it is possible to compare their output under like conditions and the figures are posted on the bulletin boards, although without comment. Thus the report for Jan. 19, 1919, showed inspections as follows: Maximum, 48.5; minimum, 25.8, and average, 33.5.


INSPECTORS
5
6
7
8
9
10
11
12
1
2
3
4
5
6
7
8
9
10
11
12
WEEKDAY AND SATURDAY
Inspection Duties
Queens Road Morning Duty by Motor Inspectors
TO STAGES OF TERMINI
DUTY 1 ANTRIM END
DUTIES 1 AND 2 EARLY AND LATE
CENTER TO END OF 1½D STAGES
DUTY 3 FALLS END
DUTY 4 BALMORAL END
CITY CENTRE
DUTY 5 ANTRIM END
DUTIES 3,4 AND 5 EARLY AND LATE
DUTY 2 ORMEAU END
END OF 1½D STAGES
Duties 1 and 2 Early and Late Shifts Work Outer Areas
Duties 3,4 and 5 " " " " Inner "

INSPECTORS REPORT SHEET No. 1

BELFAST CITY TRAMWAYS.

RETURN OF INSPECTIONS.

Inspector ______ No

Day ______ Date ______ 19 ______ Route ______

| TIME | CAR No. | ON AT | OFF AT | [illegible] | CONDUCTOR | No. | REMARKS | [illegible] |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

FIG. 4—TEN TICKET INSPECTORS MAKE 10,000 CHECKINGS A MONTH

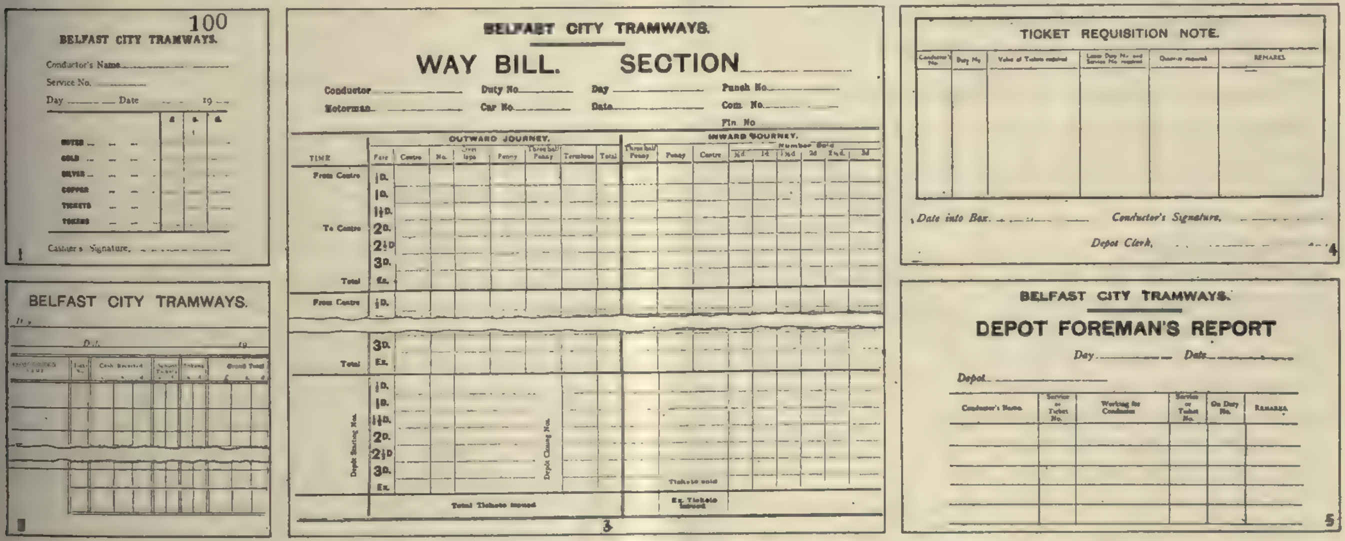
At top, chart showing hours inspectors are on duty. At left, ticket inspector's report sheet. At right, chart used to assign duties to traffic inspectors.

## HANDLING CONDUCTORS' RETURNS AND ACCOUNTING FOR TICKETS

All cash and ticket transactions between the conductors and the traffic department are carried on through eight depot cash clerks. These clerks, who are discharged soldiers, handle everything—the punch, bag, money and tickets—and also carry stocks of tickets as drawn from the main ticket storeroom.

A conductor desiring a supply of tickets makes out a "Ticket Requisition Note" as shown in Fig. 5 and presents it to the depot clerk. The latter draws the supplies from a bin reserved for this particular conductor's stock. Belfast uses the 10,000 ticket-of-each-class system, each conductor receiving his tickets in serial order until the supply is exhausted. The practice is to keep 2000 tickets ahead at the divisional car-house, while the remaining tickets stay at the main ticket storeroom to be drawn upon by requisition from the depot clerks. Evidence that the local stocks need replenishment is afforded by sending on the conductors' requisitions as filled.

Each conductor on beginning his day's work receives from his depot clerk a way-bill which shows the terminal times for the entire day. The conductor himself writes in the starting numbers of his tickets in the



100
BELFAST CITY TRAMWAYS.
Conductor's Name ______
Service No. ______
Day ______ Date ______ 19 ______

| | £ | s. | d. |
|---|---|---|---|
| NOTES | | | |
| GOLD | | | |
| SILVER | | | |
| COPPER | | | |
| TICKETS | | | |
| TOKENS | | | |

Cashier's Signature, ______
1

BELFAST CITY TRAMWAYS.
Day ______ 19
Cash Received
Grand Total
2

BELFAST CITY TRAMWAYS.
WAY BILL. SECTION ______
Conductor ______ Duty No. ______ Day ______ Punch No. ______
Motorman ______ Car No. ______ Date ______ Com. No. ______
Fin. No ______
OUTWARD JOURNEY. INWARD JOURNEY.
TIME Fare Centre No. Penny Threehalf Penny Terminus Total Threehalf Penny Penny Centre
From Centre ½D. 1D. 1½D.
To Centre 2D. 2½D 3D.
Total Ex.
From Centre ½D.
3D.
Total Ex.
Depot Starting No. ½D. 1D. 1½D. 2D. 2½D 3D. Ex. Depot Closing No.
Tickets sold
Total Tickets issued
Ex. Tickets issued
3

TICKET REQUISITION NOTE.
REMARKS
Date into Box ______ Conductor's Signature, ______
Depot Clerk, ______
4

BELFAST CITY TRAMWAYS.
DEPOT FOREMAN'S REPORT
Day ______ Date ______
Depot ______

| Conductor's Name | Service or Ticket No. | Working for Conductor | Service or Ticket No. | On Duty No. | Remarks |
|---|---|---|---|---|---|
| | | | | | |

5

FIG. 5—FORMS USED IN BELFAST TICKET ACCOUNTING

No. 1—Receipt for money and ticket returns.
No. 2—Depot clerk's summary of daily receipts.
No. 3—Way-bill for day's work.
No. 4—Conductor's ticket requisition.
No. 5—Depot foreman's report of ticket issues.

CLASSIFICATION OF BELFAST PASSENGERS ACCORDING TO FARES PAID

| Fare, Pence | Week Ended Nov. 17, 1916 | Per Cent | Week Ended Nov. 16, 1917 | Per Cent | Week Ended Nov. 15, 1918 | Per Cent |
|---|---|---|---|---|---|---|
| ½ | 144,811 | 10.60 | 111,226 | 7.63 | 85,408 | 5 8 |
| 1 | 1,135,342 | 83.00 | 1,016,361 | 69.75 | 736,063 | 49.6 |
| 1½ | ........ | ..... | 220,332 | 15.12 | 304,764 | 20.6 |
| 2 | 82,332 | 6.00 | 82,596 | 5.67 | 242,611 | 16.3 |
| 2½ | ........ | ..... | 19,276 | 1.32 | 80,932 | 5.5 |
| 3 | 4,717 | 0.40 | 7,406 | 0.51 | 23,793 | 1.6 |
| 4 | ........ | ..... | ....... | ..... | 9,005 | 0.6 |
|  | 1,367,202 | 100.00 | 1,457,197 | 100.00 | 1,482,576 | 100.00 |

NOTE—First revision of fares, May 21, 1917; second revision, July 1, 1918.

space provided at the lower left-hand corner and also the closing numbers in the space opposite. At the top of the waybill are the identifications relative to the crew, the tickets, the duty (run) and the punch numbers. The remainder of the page and the three pages following are available for the sales report of each of the various trips.

Conductors are supposed to make blind returns, but it is fairly certain that they count their returns. At one time, it was customary for the men to drop their canvas money and ticket bags into a safe with a zig-zag entrance. This was superseded by the present conductor-to-clerk arrangement because too many complaints about shorts resulted. Sometimes the conductor forgot to deposit anything! Now all returns are counted in the presence of the conductor. On accepting the return, the clerk gives the conductor a receipt (see illustration) for all the money, tickets and tokens received. The duplicate of this receipt stays in the receipt book, which is sent to the traffic department headquarters the following morning together with a summary of all cash, tickets and tokens received from the individual conductors. This summary sheet is also illustrated in Fig. 5.

The punches are opened and resealed by the depot clerks. It is not considered necessary to count the punchings, except in cases of suspected dishonesty, as the check of tickets sold compared with the opening and closing numbers of the punch is sufficient. As a matter of fact, the reports of the ticket inspectors indicate that it scarcely pays to have a checking system for other than the moral effect, because the losses due to dishonest conductors are so small.

In addition to the eight depot clerks, whose duties are by no means confined to the handling of the conductors' returns, there are three girls at headquarters (ticket dispatching department) engaged in issuing tickets to the divisional car depots and also in checking the reports of the traffic inspectors, etc. Five male clerks in the audit department are also employed from 9 a. m. till 12 noon on the cash returns and certain traffic sheets, after which they are engaged in general accounting duties. Thus both the tickets and the returns for a traffic of about 250,000 passengers a day are handled through the part-time service of three girls in the ticket department, five male clerks of the audit department and eight depot clerks, or sixteen people in all.

### ORDERING, STORING AND DISTRIBUTING TICKETS

Tickets are ordered from the Auto-Ticket Printing Company, Ltd., Liverpool, in lots of 3,300,000, numbered from 1 to 330 inclusive, thus giving 10,000 per "service" for a given denomination. The following lots are numbered A1 to A330 and so on through the alphabet so that by the time the alphabet is completed all the earlier letters will have been worked off. As the tickets are often delivered irregularly, a book is kept of all the numbers on order, arranged vertically. As a given group is received a blue line is drawn alongside, while a red line is drawn alongside the gaps to serve as a reminder that the tickets are not arriving in order of use.

The tickets are stored in individual bins for each conductor according to his service number and issued in the order of the serial numbers. A stock sheet in each bin shows what tickets of this 10,000 group per denomination have gone out and what tickets are still in. A continuous inventory is thus secured from the data shown by the conductors' requisitions to the carhouse clerks or depot foremen and by the latters' daily reports of tickets issued to regular conductors or their substitutes (see Fig. 5). Of the 330 ticket-service numbers, 284 are permanently assigned to regular conductors, grouped largely according to depots, and the remaining numbers are spare for extras.

Although the individual bin system is the basis of the ticket distribution, it is not rigidly adhered to as it may sometimes be desirable for the conductor of a busy line to work off some of the tickets of a less busy man. Due entry of such exceptions is made not only on the individual stock sheets but also in a ledger. Consultation of this stock ledger shows immediately what ticket-service number and serial numbers were used by a given conductor on a given day. It is enough to have a ticket to find out quickly by what conductor it was issued and on what day. In fact, it is possible almost to identify the individual trip without recourse to the waybill statistics.

### CONDITIONS OF EMPLOYMENT

Besides the three traffic regulators and ten ticket inspectors the supervisory staff includes four motormen's inspectors. The present platform staff numbers 650. About 260 men who volunteered are still waiting demobilization. Upon their return they will be restored to their old positions as far as practicable, and then the tramways will be in position to give more service. There are no women conductors.

Aside from the 30s. weekly war bonus, the scale of pay is as follows:

| | |
|---|---|
| First twelve months | 4¾d. per hour |
| After twelve months | 5¼d. per hour |
| After two years | 5¾d. per hour |
| After three years | 6¼d. per hour |

After five years, long-service bonus of ½d. per hour

It is evident from the foregoing figures that, upon the basis of the maximum sixty-hour week, a man in service more than two years and less than three actually gets more war bonus (6d. an hour) than regular pay, which is 5¾d. an hour. This comparison will give some idea of how the wages account has risen in Ireland as elsewhere.

Regular working hours are fifty-four to sixty a week, but time on Sundays is counted as 25 per cent extra. Each regular service man, according to an agreement with the union, must be paid for a minimum of nine hours for every day on duty. Working hours are figured from fifteen minutes before a man leaves the depot to fifteen minutes after he returns to the depot. In all cases this non-platform time must be spent at the carhouse. A material portion of fifteen minutes is also counted as a quarter of an hour. If a man is relieved at any place other than his relief point, he is paid for the time ken by his car to reach his relief point. Conductors ho commence or complete their day's work at a point n any car route away from their depot are credited ith the time taken in proceeding between that point nd the depot for the purpose of personally obtaining r depositing their punches.

The men are divided into three classes according to eniority, namely gold-band men, letter men and red-and men. The gold-band men, who are the oldest, are ssigned to morning and afternoon shifts, the meal elief and night shift being taken by the letter men. he red-band men take out extras during the morning, noon and evening rushes, working from two to three hours each period. Under normal conditions, every man has one day off in seven.

Mr. Moffet is a strong believer in telephone control, having worked out such asystem while general manager of the West Ham Corporation Tramways. He hopes to get one for Belfast when the outlook for both expenditures and deliveries is better than now. The same viewpoint applies to the installation of car-checking devices, which he advocated and used for nearly a decade when he was connected with the Rochdale Corporation Tramways.

# Railways Are Agents of the Public*

## The Main Task which Confronts Both Operating Men and Manufacturers Is to Sell This Idea of "Agency" to the Car-Riding Public

BY HARLOW C. CLARK
American Electric Railway Association

WHAT is the matter with the American electric railways? This question can be answered in three words—it is broke. But electric railways should not act broke. I cannot convince myself that the great business of furnishing local transportation offers so few possibilities that there is nothing in its future except bankruptcy and abandonment. I believe that with determination, with courage and with intelligence, the problem can be solved. I believe that in the readjustment of income and outgo, these methods are possible and should be followed—first, that the outgo should be reduced to its lowest possible level, and, second, that the income should be increased so as to cover the necessary expense of doing business. I believe that to accomplish this result a survey of the field is necessary to determine just what service the public now requires of electric railways, and I believe that this survey should be made in disregard of the kind of service electric railways have in the past furnished.

New factors have entered into the situation. Recent statistics show that there is one automobile for every eighteen persons in the United States. This method of transportation has pre-empted a part of the field that was formerly occupied by the electric railways, and although the electric railway riding habit, which increased twenty-five rides per inhabitant between 1902 and 1907, and fifteen rides per inhabitant between 1907 and 1912, increased but three rides per inhabitant between 1912 and 1917, and it is perfectly well known that the deceleration is continuing, I have failed to find anywhere an investigation, or a statement, or an opinion, as to how, if at all, the service formerly furnished communities by electric railways should be modified in view of this feature of the situation. It is obvious that there is nothing that we can do to prevent in any degree the competition the privately owned automobile furnishes. It is equally obvious that if our riders are being taken away from us by this method of transportation, we cannot afford to give the service formerly furnished. What, then, is the function that we should perform?

To-day the job before the electric railway man is a job of merchandising, a job of finding out what the people want and giving it to them. I have read many statistics and have listened to many comments as to the effect of increased fares upon the riding habit. In most discussions of this subject, figures play a principal part. In very few of them has there been any attempt to study the underlying reason for this falling off in travel when fares are increased.

There is in the United States to-day, as far as I know, no street car fare which in terms of the individual's income is larger than was the 5-cent fare when it was willingly and freely paid by the inhabitants of the United States ten or even five years ago. Hence—as any merchant or any manufacturer would do under similar circumstances—one of the first things that should be done is to ascertain the causes for the falling off in income under those increased fares, if such a falling off is found to be a fact, and when these causes are determined to fit the service to the needs of the community and the habits of the people so that it can be furnished under rates of fare which they will pay.

### ALLIANCE WITH THE CAR RIDERS

If the electric railway industry is to be put on a stable and firm foundation, it must form an alliance, offensive and defensive, with the car rider and not the man who uses the automobile. In one form or another, service-at-cost is here. The owners of electric railways securities can no longer expect, if they ever expected, to receive a return upon their investment greater than will attract money into the enterprise. Capital's return being thus limited to the minimum that will keep private enterprise in public service, it is evident that it is to the car rider's interest that every impost, tax, license charge or cost of operation be reduced to its minimum.

There are not a few gentlemen, both in and out of the industry, who advocate the public subsidization of electric railway transportation. It is, perhaps, possible that this in the end may be necessary, but it would seem a measure of common sense that before such a radical step is resorted to, the charges levied against the cost of transportation for the benefit of others than those persons using the transportation should be eliminated. There may have been a time when such taxes and imposts were levied against the owners of the property and taken out of the profits that would have otherwise accrued to these owners, and under those circumstances it may have been possible to defend them as proper charges. Under existing circumstances, however, there is no such defense.

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*Abstract of address delivered before New England Street Railway Club, May 22, 1919.

If the alliance of which I have spoken is formed, if the car rider can be persuaded that his interest and that of the company which furnishes him street car service are identical, the battle which we are waging in behalf of the industry is half won. We are then approaching the firm foundation for the structure of public relations which we hope to erect, for what electric railways as corporations cannot do, electric railways acting as the agents of their patrons can do.

That is the first big idea that must be "sold" to the public, or that portion of the public which constitute the body of car riders. It is not such an extremely difficult task. It has been done in the city of Cleveland, where under the original cost-of-service plan the car rider has come to recognize the fact that his street-car service cannot be loaded up with charges that should properly be borne by the community as a whole or some particular part of the community without directly affecting the car fare.

I presume that the average street railway pays out in taxes, licenses, paving and other charges at least 8 per cent of its gross receipts, and I should estimate from the statements of a large number of companies that I have examined that at least 6 of this 8 per cent is paid because these companies are street railway companies and would not be paid were they engaged in any other business than that of furnishing public service. In addition, there is each year paid in fixed charges a very considerable item, necessitated by capitalization of the cost of paving and other construction incurred entirely for the benefit of the community and not of the car rider.

Now it is a matter which very closely concerns the man who uses the street car, whether he shall be compelled to pay through increased car fare these charges from which he reaps no benefit. It equally concerns him whether the city authorities co-operate in every measure that will make for economy and efficiency in the operation of the system.

### FOUR PARTNERS IN PUBLIC SERVICE

It has been said that there are four partners in the furnishing of public service by private corporations:

First—The public, which receives the service;

Second—The employees, who receive wages;

Third—The government, which receives taxes and license fees;

Fourth—The owners, who receive a return upon their investment.

Although it is necessary because of the magnitude of the operations which electric railways carry on, to talk in large figures, the proposition is after all, when reduced to its lowest terms, a very simple one. It is, in the end, a question of a fair division of the fare received—how it shall be apportioned. It is apparent that if one of the so-called partners secures an undue share, it is at the expense of the other partners, and this is an idea that should be driven home with all the force at our command. There can be to-day no contention that the owner-partner is receiving an undue share. In most instances, this partner is receiving nothing!

Before one can in any way indicate how either railway men or manufacturers can assist in putting the electric railway industry upon a firmer basis, he must in some general way, at least, indicate what this firmer basis is and how it can be approached. I am going to suggest these general heads:

1. That a determination be made of just what functions street railways—in view of the changing conditions in transportation, brought about by the development of the automobile—should continue to perform in their communities.
2. That, these functions having been determined, it be decided what of the service now being performed can be abandoned if such abandonment is indicated as necessary.
3. That the relations between the companies and the communities be readjusted upon a basis which will give to the private operators of the property a fair and just and assured return upon their investment, with additional incentive for economy and initiative in management.
4. That the corporations performing these services be considered and treated as agents of the car-riding public, and every form of tax, license and impost which is now levied against them upon the plea that it is being paid from the profit of the owners be removed.
5. That public co-operation be sought in securing the most efficient and economical operation possible through the speeding up of schedules, use of one-man cars, proper traffic regulations and such public privileges as may be justified upon the ground that the street car is performing a transportation service for the largest portion of the community.
6. That with these conditions assured, the service to be performed be prescribed by the car-riding public through public authorities and that the fare to be charged be automatically regulated by the cost of furnishing the service so prescribed.

This is, of course, a very general program. I have not attempted to go into details. I have not discussed the zone or the flat-rate system of fares, or the policy of charging for transfers. The experience in this country as to zone fares is limited. Some interesting experiments are being undertaken, and it is hoped that before long the country will have the benefit of the trial in New Jersey of a unique system of charges based on a stand-by charge plus a distance charge.

This question of a method of levying street car fares, however, is in my opinion very largely a social question. I believe it so closely affects the civic and social life of every community that the primary consideration in the determination of the method of charging, whether by zones or by flat rates, is a social question and not entirely one of expediency for the street railway. Moreover, I am not convinced that conditions in all communities of the country are so nearly similar that what is advisable as to fares in one would be advisable in all others. There are "local conditions," but underneath these "local conditions" there are certain general conditions which apply universally, and so I believe it is possible to arrive at certain general principles that will apply equally wherever street railways are operated.

These principles, as I see them, I have just stated. They are based entirely upon the theory—and I believe it to be more than a theory, I believe it to be a fact—that the furnishing of local transportation is a public function which for purposes of convenience and economy and efficiency can best be furnished by private enterprise and private initiative. In the development of the electric railway industry, this basic fact has been lost sight of by the owners and operators to a very large extent and to a very much greater extent lost sight of by the public itself, which has come to regard the corporations furnishing this service as private enterprises engaged not in a public business, but in a private business whose main purpose is the making of undue and exorbitant profits.

### AGENCY THEORY MUST BE RECOGNIZED

It is evident that there can be no satisfactory adjustment of conditions until this impression or belief—for it is more than an impression—has been removed and the local transportation companies are looked upon by the public as their agents receiving a reasonable and just compensation for their services, but acting for the public in the performance of the duties imposed upon them. As long as the public holds any other view the settlement of electric railway problems is going to be impossible, and I conceive it to be the main task which confronts both railway men and manufacturers to exert their efforts towards "selling" this idea of agency.

How can it be done? It can be done, as every other idea that has captured the public mind has been put over, by the printed and spoken word. It can be done if the man at the head of each property thinks it is the thing to do, and if he in turn convinces the men under him that it is the thing to do, and they in turn convince the people with whom they come in contact that it is the thing to do, and they in turn convince other people that it is the thing to do.

### SERVICE TO THE FORE!

It can be done if, in every written or spoken utterance of the owners and operators of electric railways and of the manufacturers interested in electric railways, the idea is kept clearly in mind and the thought of service is kept prominently to the fore. For, after all, what the car riding people of the United States want is "SERVICE." People use street cars for two reasons, because they have to, and because they want to. It would be interesting to know how the division of street car riders on American electric railways stands as between those who have to ride and those who want to ride. It is probably true that companies will always get the riders who have to ride, or at least until some other mode of transportation comes to relieve them of the necessity of riding on the electric lines. It is equally true that unless the electric railways make people want to ride, they will not secure or retain the second class of riders.

The job of making people want to ride seems to be a job of making the service such as will make it easier to ride than to walk or to use another sort of vehicle. That means frequency, it means comfort, it means convenience, it means speed and it means uninterrupted schedules. A very large part of this program cannot be carried out without the co-operation and active assistance of the public who patronize the service.

I have no fear of the ultimate effect of such fares as are necessary to cover the cost of service. I know that for years people have willingly and cheerfully paid the unit fare of 5 cents. I am equally certain that any fare necessitated by the cost of service in the immediate future will not, in terms of income, be in excess of the nickel. I believe that if it is possible for other industries to educate people to the higher price level that now maintains and is to maintain, it is possible for the electric railway industry to do so.

I believe that once the public is impressed with the fact that electric railway companies are its agents and are deriving from this agency no unjust or undue compensation and are performing the task to the best of their ability, the friction which now exists will be removed. Then the public will unite and co-operate in an effort to readjust its relations with the companies so that the end which we all seek—a just return for the owners and efficient service for the communities—will be achieved.

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## Southwestern Association Starts Up

### Meetings of the Association Are Resumed with a Lively Discussion in Galveston of Current Operating Problems

THE fifteenth annual convention of the Southwestern Electrical & Gas Association was held in Galveston, Texas, on May 12-14. The convention in general was organized in the form of separate section meetings for electric light and power, for gas and for electric railway groups in the mornings and a general session later in the day. Burr Martin, vice-president and general manager Texas Electric Railway, Dallas, and vice-president of the association, was acting president in the absence of President W. A. Sullivan, general manager Shreveport Railways.

The opening address at the first session was given by I. H. Kempner, Mayor of Galveston. Mr. Kempner said that the present city administration had been criticised because it permitted an increase in lighting rates and street car fares, but that the increases were allowed because the city officials were shown that the demands of labor for increased wages were justified on account of the increased cost of living. He was convinced that the right thing had been done, although the officials might suffer for it.

Acting-President Martin spoke in part as follows:

> Public utilities have the right to expect to prosper, and we should work to educate the public to realize that rate increases have to be made if the efficiency of the utilities is to be maintained. Public confidence is the greatest asset which the public utilities can have. Without it the managers are fighting a losing fight. They may go against public opinion for a while, but they will suffer sooner or later. It has been the policy of too many to care little for public opinion, and then they wonder why better results are not obtained.
>
> Before changes are made or a new system installed you must try to view it from the point of view of the public and strengthen public opinion in your favor. There can be no success without the managers keeping in touch with the public. Impress upon the public that its welfare is dependent upon your success. There are a few who realize this fact, but the rank and file must be educated. The attitude of the managers of utilities has been too impersonal."

H. S. Cooper, secretary of the association, stated that the membership had decreased during the last year. There are seventy-five or eighty utilities in Texas which are not represented, and Mr. Cooper urged that efforts be redoubled to increase the membership.

### ONE-MAN CAR SUCCESS

David Daly, manager Houston Electric Company, presided at the first meeting of the electric railway section on May 13. Practically the entire session was devoted to discussion of the practicability and the efficiency of the one-man car. Mr. Daly said that the economy which was obtained through this type of car was great and that the profit should be split among the public, the employees and the company itself. In his opinion the day is gone by when the public will let any company get the big end of the profit resulting from an innovation, and more cars and service first should be uppermost in the minds of utility operators.

G. S. Brush, of the Houston Electric Company; A. F. Townsend, manager Eastern Texas Electric Company, and W. T. Montgomery, of Monterey, Mexico, described the service given by their respective companies. Mr. Montgomery, in relating his experience in Mexico, said that the government had taken over the roads in 1914 with the result that the cars were almost worn out. It was in this condition that the railways were given back to private operation in 1917. Mr. Montgomery then introduced a makeshift Birney car by closing the back end of the ordinary street car, and he put these cars on the better lines of the company in the section occupied by foreigners.

### OPERATING PRACTICES DISCUSSED

Skip stops, flagging over steam railroad tracks, transfers and collection of fares were discussed at the second section meeting for electric railways. C. I. Plummer, of Dallas, told of the savings which had resulted through the introduction of the skip-stop in that city. The average rate of speed had been increased from 8.75 to 9.85 m.p.h., and there had been a 20 per cent saving in the wear on the brakeshoes. The skip stop is in effect except on rainy days, and it is used until 10 o'clock at night. Mr. Daly declared that he favored the skip-stop practice and hoped the public would become educated as to its benefits.

In regard to flagging Mr. Daly stated that street cars have as much right to the street as steam railroad trains, if not more. Electric railways have been too much inclined to give the railroad trains the right-of-way because they are heavier and can smash the cars to bits. H. M. Smith of Port Arthur and Mr. Martin discussed the adoption of means for placing the responsibility for accidents at steam railroad crossings more on the motorman instead of partly on the conductor.

F. O. Greyson, of St. Louis, told of the introduction of metal tickets in many cities as a result of the increase of fares above 5 cents. These tickets eliminate the inconvenience caused by the making of change in pennies. They can be registered in a specially prepared box register.

The elimination of transfers was discussed, but it was declared that such action would be an injustice to some patrons, particularly factory employees who often live at considerable distances from their places of employment. It was stated that it would be sure to result in public agitation, which would be unpleasant for the railway companies.

"Standardization" was the subject of an address by Milton H. Wagner, representing the United States Bureau of Standards, Washington, D. C. Mr. Wagner declared that there should be a universal safety code throughout the country in order to prevent many unfortunate accidents. He said that safety first should be at all times uppermost in the minds of not only the general public but also all the employees of public service corporations.

E. P. Schoch, head of the department of chemistry of the University of Texas, gave an address on Texas lignite. Mr. Schoch said Texas has one-third of the total lignite supply of the entire nation. In his estimation a capital of $250,000 will be necessary to finance a trial plant to determine the fuel value of lignite. The United States government has promised $100,000 for this purpose, the University of Texas has set aside $20,000 for the plant, and approximately $50,000 is expected to be contributed by the lignite miners. He thought that utility organizations should be sufficiently interested in the project to appoint a committee to consider the question of contributing. The suggestion was not acted upon.

### TEXAS' MOST URGENT NEED

First prize for the best-written answer to the following question—"What is the most urgent present need of the public utilities of Texas, and how can it be best and most quickly fulfilled?"—was given to G. H. Cushman of San Antonio. Mr. Cushman declared that a public service commission which would give stable rulings on rates and remove the question from politics was the most urgent present need.

The following officers were elected: Burr Martin, Dallas, president; A. Hardgrave, Dallas, first vice-president; C. E. Calder, Dallas, second vice-president; A. H. Warren, El Paso, third vice-president; H. S. Cooper, secretary, and T. B. Walker, Dallas, treasurer. Mr. Hardgrave was chosen chairman for the electric railway section for the ensuing year. The following executive committee was chosen: Burr Martin, Dallas; A. Hardgrave, Dallas; B. E. Calder, Dallas; A. H. Warren, El Paso; H. C. Morris, Dallas; R. Meriwether, Dallas; S. R. Bertron, Jr., Houston; F. D. Murphy, Houston, W. B. Tuttle, San Antonio; G. H. Clifford, Fort Worth; A. F. Townsend, Beaumont; C. H. Couser, Houston, and Howard Smith, Port Arthur.

## Country's Coal Supply Not Inexhaustible

THE coal resources of western Pennsylvania will have been practically exhausted sixty years from now if the present rate of increase in consumption is maintained, E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, declared in an address before the Purchasing Agents' Association of Pittsburgh at its annual banquet on the evening of May 9.

"Generation of electricity at the mines would decrease transportation waste 35 per cent," Mr. Herr asserted. "A corollary benefit would be the release of much rolling stock for other uses and a consequent reduction of investment demands for railroad equipment."

Not only the Pennsylvania fields but even the newer coal territories are measurably near exhaustion, according to Mr. Herr. Unexpected inroads have resulted from war demands, he explained.

"I am referring, however, only to the present available supply," he qualified. "The world contains a coal reserve that under pressure of greater and greater necessity could be utilized and would last probably 1500 years. That is no excuse for waste, though. We must not, through prodigality, force coming generations to use the power of the sun and the ocean if less expensive energy can be left available to them for their use."

# President Acts to Aid Car Lines

### Cables Approval of a Federal Commission to Investigate Problems of Electric Railways After Situation Is Presented by Secretaries—Members of Commission Not Yet Named

ON MAY 20 announcement was made at Washington that President Wilson had cabled his approval of the plan of Secretaries Redfield and Wilson for the creation of a Federal Commission to investigate the problems of the electric railway systems of the country. It is well known that the burdens under which the electric railways are suffering, through no act of their own, but brought on entirely as the result of the war, have been thoroughly understood and appreciated at Washington since the present condition of affairs began. As long ago as Feb. 19, 1918, President Wilson, in replying to a letter from the Secretary of the Treasury on the subject, expressed the belief that everything reasonably possible should be done to maintain the public utilities at their maximum efficiency and the hope that the state and local authorities would respond promptly to the necessities of the situation. The National War Labor Board also, in practically all of its decisions, urged that adequate relief, in the way of increased rates, be allowed to the railways to compensate for the increases in wages awarded.

Recent receiverships of a number of important electric railway companies with the inevitable impairment of service possible to be rendered by them, coupled with evidences of further probable cases of insolvency on the part of important systems, have emphasized in the minds of the administration the need for prompt action. In consequence, the secretaries of the Departments of Commerce and Labor recently cabled to the President at Paris the accompanying letter, reciting the situation, referring to the national aspect of the situation and recommending the appointment of a federal investigating committee. The secretaries point out that the committee will not be considered an intrusion upon the functions of either state or municipal governments as both the National Association of Railway and Utility Commissioners and the Conference of Governors and Mayors had requested federal aid and federal consideration of the problem of preventing the financial disaster threatening the industry.

The President's approval of the plan establishing this commission insures its appointment, and it is expected that its composition will be announced at an early date.

It was stated at Washington on May 22 that Secretaries Redfield and Wilson are now considering the personnel of the commission, and as soon as a list of suitable names is decided upon they will be cabled to the President as suggestions to aid him in making the appointments.

### POWERS OF SUCH A COMMISSION

The powers which such a commission may actually exercise are, of course, limited. There seems to be some confusion in the daily press on this point, perhaps because of the earlier notices of a proposed Federal Public Utilities Commission which was to have power to regulate and determine local rates as a war measure. What-

## Letter to President from Secretaries Redfield and Wilson

DEPARTMENT OF COMMERCE

Washington, D. C., May 15, 1919.

Dear Mr. President:

The Electric Railway problem to which your attention has been called on several occasions has recently assumed such serious national proportions as to warrant the prompt attention of the Federal Government. Already fifty or more urban systems, representing a considerable percentage of the total electric railway mileage of the country are in the hands of receivers. The communities affected are among the most important—New York, Providence, Buffalo, New Orleans, Denver, St. Louis, Birmingham, Montgomery, Pittsburgh, Memphis, Ft. Wayne, Des Moines, St. Paul, Spokane, Chattanooga.

Other large systems are on the verge of insolvency, for the industry as a whole is virtually bankrupt. The continued shrinkage in the value of hundreds of millions of electric railway securities held by savings banks, national banks, life insurance companies and by the public at large threatens to embarrass the nation's financial operations. Furthermore, the withdrawal of this industry's buying power, which is said to rank third in magnitude involves the unsettlement of collateral industries, naturally entailing labor dislocation that will affect hundreds of thousands of employees.

The return to normal conditions is being hampered and the efforts of the Government to avert strained conditions in finance, labor and commerce are being less fruitful of satisfactory results than should be expected, if some solution of the electric railway problem were in view.

What the solution is, may, we believe, be evolved by a thorough investigation of general franchise and operating conditions in their relation to rates, including service-at-cost plans, state and municipal taxation, local paving requirements, and internal economies that may be effected.

We, therefore, propose and recommend the appointment by you of a Federal Board or Commission, whose duty it shall be to study and report upon the entire problem, in order that the State and Municipal authorities and others concerned may have the benefit of full information and of any conclusions or recommendations that may be formulated. Such a study will, in our opinion, exert a helpful and constructive force in this critical period of the industry's existence, and will aid in the readjustment. If you would make such an appointment before June. 30th, your Contingency Fund could be used to defray the expenses, which would be about $10,000.

The National Association of State Commissioners has always invited Federal aid in this matter and the recent Conference of Governors and Mayors adopted a resolution recommending Federal consideration of the problem of preventing the financial disaster threatening this industry.

We propose that such a commission shall be made up of one representative of each of the following groups:

Treasury Department or War Finance Corporation; Deparment of Commerce; Department of Labor; National Association of State Commissioners; American Cities League of Mayors; Amalgamated Association of Street and Electric Railway Employees; American Electric Railway Association; Investment Bankers Association of America.

We respectfully urge your authorization for such a Commission, to be followed by your formal proclamation upon the selection of personnel.

Cordially yours,

[Sgd.] WILLIAM C. REDFIELD,
Secretary of Commerce.
[Sgd.] W. B. WILSON,
Secretary of Labor.

ever powers of this nature might have been possessed during the war, it is generally expected in Washington that the present commission will have no such power, but that it will be created for the sole purpose of making an economical study of the electric railway situation. Undoubtedly questionnaires will be issued to the various roads, asking for information with reference to their financial and operative conditions, the burdens imposed upon them by local regulation and franchise requirements, the amount of their outstanding stocks and bonds, etc. The replies received from companies will then be tabulated with a view to determine the conditions of the industry to-day, the causes of its failing revenues and the remedies which will be applied. It is possible also that hearings may be conducted. An outline of the possible work of such a commission is contained in a report recently rendered to the Investment Bankers' Association of America by its Committee on Public Service Securities, of which O. B. Willcox is chairman. This report will be found in abstract below.

### REPORT OF INVESTMENT BANKERS' COMMITTEE

"There has been a good deal of discussion relative to the establishment of a federal board or commission on street railways. It has been proposed that such a board might have the same advisory powers with respect to street railway fares, franchises, etc., as the War Labor Board had with respect to wages. The Federal Government would have no power over street railway affairs, except in cases of interstate railways which are now under the Interstate Commerce Commission, and at most advisory. While a Federal Board might be influential in acting in the rôle of arbiter in specific cases, it could not be expected that it would deal promptly or in time to be of much value in the hundreds of cases in which the street railways find their revenues inadequate for payment of operating expenses and a fair return on capital. On the other hand, an investigation of all the facts and a statement of principles by a board with the prestige of appointment by the President as a federal agency would undoubtedly be of great help in reaching a solution of the street railway problem.

"At a meeting of the committee on Public Service Securities held in New York on April 10, 1919, after a discussion of the whole subject, the chairman was instructed to send the following letter to Roger W. Babson of the Department of Labor.

At a meeting of the committee on public service securities of the Investment Bankers' Association of America, held to-day, the chairman was instructed to advise you that the committee has welcomed your statement that the United States Department of Labor is addressing its efforts toward finding some method by which the relations between the street railways, the car riders and the public authorities will be put on a more satisfactory basis.

It is common knowledge that the abnormal increases caused by the war, in wages, costs of fuel and materials, and taxes, without corresponding increases in revenue, have resulted in such decreases in the net earnings of local transportation companies that they are unable to pay their operating expenses, taxes, and a fair return on the investment, and that while other industries have advanced their charges to offset increased costs, the revenues of the transportation companies have not been increased in the same proportion, and that the street railways of the country are in a perilous condition, many of them facing bankruptcy.

For example, a special commission for an investigation of problems relating to the street railways appointed pursuant to an Act of the General Assembly of Connecticut has just reported that: "A summing up of the evidence presented to this commission shows that with the exception of 12.8 miles of street railway in the state out of a total of 828 miles all of the lines are either in the hands of receivers or are insolvent, and must have their service to the public either partially or completely discontinued and portions of their lines abandoned and sold for junk unless substantial temporary relief is furnished through adequate legislation by the General Assembly of 1919. If proper action is not taken by this assembly it will be too late to remedy the neglect in 1921 and an irreparable injury will be done to the vital transportation arteries of the state, causing suffering, personal loss, depreciation and discontent to a large and most valued portion of the population of the state who have as a result of street railway facilities purchased, built or rented their homes along the street railway lines or near them and are dependent upon these lines for getting to and from their daily work, obtaining provisions and supplies, as well as being in many cases investors in the securities of the street railway lines passing their properties."

The whole country is interested in adequate local transportation at fair rates and the expansion of that service to meet the growing demands of increasing population and expanding industry. The difficulties of the local transportation systems are not confined to one section of the country, but are general all over the United States, and are therefore of national interest, and in all parts of the country these difficulties seem to be due to the same general causes and should be susceptible to common remedies, and remedies must be found promptly to prevent enormous losses to investors, to industry, and to the nation.

These difficulties appear to require a readjustment of the relations between the street railways, their employees, the car riders, and the public, which can hardly be accomplished piecemeal, but only by a general knowledge of all the facts and a general recognition of the principles which should govern those relations.

There is nobody nor authority either competent to make a thorough and impartial investigation of the facts or of sufficient dignity and importance to give such weight to its findings and recommendations as would promise acceptance throughout the country.

This committee therefore recommends the early appointment by the President of a federal board on street railway conditions, on which there would be representatives of the United States Department of Labor and other interested departments of the Government, of the street railway companies, of the American Bankers' Association, the Investment Bankers' Association of America, and the Chamber of Commerce of the United States, and of the National Association of Public Utility Commissioners, with adequate statistical and clerical assistants, for the investigation of the facts concerning street railways and the reasons for their present condition, and with instructions to state the principles which should govern the proper relations between the street railways, their employees, the car riders, and the public generally; in order that the people may have adequate transportation at fair rates, the rights of the public may be fully protected, the investors in street railways may be protected against loss, and new capital may be provided to meet the increasing demands upon the transportation systems in the interests of industry, the growth of the communities served and the health and welfare of urban populations.

This committee will ask William G. Baker, Jr., the president of this association, to appoint a member of the association to confer with you on the subject.

"Mr. Babson has acknowledged the letter with the statement that it has his approval and that he is in hearty sympathy with the efforts of the association for settlement of the street railway problem."

## Apparatus for Loosening Storage-Battery Plates

A special steam generator has been developed by the Hauck Manufacturing Company, Brooklyn, N. Y., for use in unsealing and cleaning storage batteries. It is provided with six jets, three of which are controlled by a valve. Steam is forced from the jets through the vents direct into the cells. The generator can be operated either by kerosene or gas. The complete equipment comprises also a 1-gal. wax-melting vessel, a 35-lb. lead-melting pot and a lead mold.

# idelights on the Zone Fare—Home Owning by British Workmen

### ower Wages and Difficulty of Securing Freehold Land More Potent Reasons for Lesser Development of Home Proprietorship Than Street Railway Fare

By WALTER JACKSON

THE writer would never have thought of preparing this particular article had not some street railway anagers who have grown up with the universal fare xpressed to him their firm opinion that home-owning y workmen in the United States was largely the result f the 5-cent fare and, conversely, that lack of such wnership in Great Britain was due largely to the raduated fare. Such an assertion might be expected om a real estate operator fearful of losing that "unarned increment." Street railway men will serve their dustry but poorly by falling for the land dealer's point f view.

It is true that home ownership is more common here an in Great Britain. Yet why should we jump to the nclusion that the difference is due to the principle of harging by distance for a car ride? May not such ital things as wages and the availability of land and apital have something to do with the case? To own is home the workman must first save enough money. hen he must see if the house that he wants to build an be put up within a reasonable distance from his ork. Finally, he wants the land to belong to him outight to avoid giving the building and other improveents to a landowner after the expiration of the leaseold. All of these steps are harder in Britain than merica.

Most of the houses owned by American workmen have een located within 5-cent fare territory, but it is safe o assert that the buyers paid a good bit more for the nd if they bought after the tracks were down than efore. If anyone believes that the real estate opertor failed to capitalize on the rate of fare, let him compare the difference in the cost of a lot in any district f suburban New York one hour out by the one-fare rolley with a similar lot in a district one hour out by he distance-fare railroad. This difference can best be xpressed in the rental values of two houses exactly like. The city house will rent for $40 and the country uplicate for say $30 a month. The city dweller will pay ut probably $3 a month for car fare to and from work. Hence, if the country dweller pays three times $3 for is monthly commutation ticket he will still be $1 a onth to the good, with fresher air thrown in for good leasure. While there are other factors that lead to one hoice or the other, we may be sure that the real estate perator thoroughly understands the game of capitalizng for his benefit any improvement in the quality, uantity and cost of transportation.

The accessibility of freehold land is another imporant factor in promoting home building by individuals. n the United States one may readily buy land outright nstead of leasing it. Furthermore, suburban land which may be cut up into building lots is more readily available. In an old country like England much of the and is held by great estates or the municipality. Hence t is not so easy for a land company to stake out new uburbs. A contumacious owner or some ancient law elating to the inviolable "common" or public land are British hindrances to suburban growth that have no relation whatever to rates of fare. It is worthy of note also, that municipal house-building projects contemplate only the renting of houses because the cities do not want to give up freehold rights.

Yet in spite of the double handicap of lower wages and land-holding difficulties, the Britisher's innate desire to possess a "castle" all his own cannot be utterly stifled. Timely proof of this comes to hand through the final report (1919) of the Housing Financial Assistance Committee of the Ministry of Reconstruction, such aid being necessary because private construction is financially impracticable.

This statement notes that for the year 1916 there reported to the Registrar of Friendly Societies 1467 building societies whose total membership was 628,285, whose total assets in mortgages were £58,000,000 and in other securities £80,000,000, and whose total liabilities to shareholders and depositors were £61,500,000. During 1916 these societies advanced only £5,000,000 on mortgages compared with £9,000,000 during 1913, the year preceding the war. Over one-half of the total amount outstanding on mortgage consisted of sums of £500 or less advanced on the security of small house property. For such societies the committee recommends:

> That local authorities should be empowered . . . to guarantee the repayment of mortgages made by approved building societies upon houses built hereafter, where the advance made exceeds two-thirds of the value of such houses; such guarantee not to exceed 80 per cent of the cost thereof, and to remain operative only so long as the outstanding loan is in excess of two-thirds of the value of the houses for the time being.

In addition to these straight-out building societies, Great Britain has 1300 co-operative distributive societies some of which have undertaken in the past the building of houses or the financing of their purchase for letting and selling on installments to members or through loans to members. These co-operatives now have an investment of £9,000,000, either in house property or on mortgage. It is not likely that these organizations will be able to do much new building unaided. The committee therefore recommends aid under houses value limitations similar to those suggested for the building societies.

A third builder for which aid is recommended is the Lands Improvement Company, a body incorporated under the improvement of lands act of 1864 to assist landowners to build cottages as a part of the equipment of their estates. It is proposed "That the improvements of lands act should be amended so as to permit the Lands Improvement Company to charge a rate of interest on loans not exceeding 6 per cent subject to income tax, or not exceeding 4½ per cent free of income tax."

Under the small dwellings acquisition act of 1899, local (municipal) authorities may "advance to residents or intending residents in their area, in order to enable them to purchase for occupation houses not exceeding £400 in value, a sum not exceeding 80 per cent of the value of such houses. In the case of freeholds and leaseholds for ninety-nine years unexpired, the advance is not to exceed £300 and in other cases £240. For various reasons comparatively small use has been made of the act.

The committee thinks that with the present great shortage of houses the small dwellings acquisition act would be bettered by being amended as follows:

1. In view of the increased cost of building, the present

limit of value of £400 should be increased to £500 in the case of freehold houses and leasehold houses where at least 99 years of the term is unexpired, the present limit of £400 being retained in the case of other leasehold houses.

2. In the case of all future mortgages, loans should be permitted up to 85 per cent of value in place of the present limit of 80 per cent of value.

3. In the special case of new houses built after the war, local authorities should be empowered for a period of seven years after the termination of the war, to advance up to either 85 per cent of the value, or 80 per cent of the cost to the first purchaser, whichever shall be the greater.

4. The maximum loan limit of £300 in the case of freeholds and leaseholds for ninety-nine years unexpired, and of £240 in the case of other houses, should be abolished.

5. Local authorities should be empowered to reconvey a mortgage, made under the act, by a simple receipt indorsed on the mortgage deed, in the same way as building societies may now do.

The committee also discussed the granting of like aid to private builders, but concluded that the danger of exploitation and the difficulties of administration made this impracticable. However, municipal authorities might make certain co-operative arrangements with local builders within the scope of financial aid from the State. It also discountenanced aid to landowners and employers who wish to build cottages, if they insist upon such houses remaining "tied," namely, on lease to the tenant.

Perhaps, the foregoing makes dry reading to an electric railway operator, but it is well for him to be apprised through these official sources that the shortage of houses in Great Britain, whether owned or leased by workmen, certainly is not ascribed to the zone fare by those who are in the position to know.

## Devices Used in Conduit Construction

SUPPLEMENTING the abstract of the N.E.L.A. committee report on power distribution given elsewhere in this issue, the following notes regarding devices used in conduit construction are worthy of mention. The sub-committee on this subject says that pneumatic cutting tools for removing pavements preparatory to conduit installation have been used to a slight extent with satisfactory results. It is expected that this class of tools will come into more general favor.

There is practically general use of power-driven concrete mixers, their use being most economical on jobs where more than twenty-five or thirty men are employed.

Kerosene torches and furnaces appear to have passed through the experimental stage and are coming into general use. A number of companies are changing over from gasoline to kerosene.

A satisfactory portable outfit for pumping out manholes has been developed, the apparatus consisting of a well-known rowboat motor with the propeller replaced by a small high-speed pump. The outfit weighs only 125 lb.

The cable grip in one form or another is in general use and attention is called to a cable-pulling eye for use where the bore of the duct is only slightly greater than the cable diameter. The eye is made of ⅝-in. round steel and is connected to the cable by stripping back the lead and insulation about 7 in., wrapping the conductors securely around the shaft and soldering them fast. The lead sheath is then bent back into its original position and wiped with solder to make a smooth and moisture-proof joint.

## Estimating the Life of Curved Special Work

BY M. BERNARD

IN A STUDY of special work layouts with reference to their most economical design and also in the determination of schedules of future renewals extending over a period of years, it is clearly advantageous if not absolutely necessary to have a knowledge of the probable life of special work. Not finding such information available, the writer while employed by one of the large Eastern electric railways, investigated the age and life records of more than 100 curved special-work layouts from which it appeared that the life of such layouts varied in the following manner:

Special work in which the life is determined by the curved component parts has a life expressed in terms of years approximately equal to the number of the template required for plotting the curve, the standard scale being 1 in. equals 8 ft. Thus with a connecting curve having a radius of 40 ft., as the plotting would require the use of a No. 5 template, the life could be approximately five years under average conditions, say, 100,000 cars per year.

Expressed in more general terms, the life of curved special work in terms of years is equal to the radius in feet divided by eight. From the investigation it was found also that the average life in terms of cars is equal approximately to 12,500 cars for each foot of radius. Local conditions should, of course, be given some weight in deciding on the probable "car-life," such as intensity of traffic, speed of cars, etc.

A comparison of the varying car traffic at a large number of locations disclosed a tendency for special work of the same general type to have a greater car life at a location having a traffic of, say, 50,000 cars annually, than at a location where the car traffic amounted to 150,000 cars. This is analogous to the fact that material which fractures under twenty blows delivered in one minute will withstand more than twenty blows if these are spread out over two minutes. For similar reasons special work over which the maximum speed is 6 m.p.h. will have a greater car life than where the speed limit is 12 m.p.h. As a rule a trailing tongue switch and mate will have less life than a facing tongue switch and mate in the same double-track branch-off. In any study of the relative efficiency of special work the question to be decided should not be the life expressed in terms of years but rather the life expressed in terms of car wheels. The rule described in the foregoing will not apply, of course, where the traffic over the straight is far in excess of that over the curved run.

## Manufacturers Prepare Organization Plan

REPRESENTATIVES of the manufacturer members of the American Association met in New York on May 13 and practically completed the first draft of a constitution and set of by-laws for an association of manufacturers to be affiliated with the American Association. This preliminary work will be concluded at a meeting to be held on or about June 2. The proposed constitution will be submitted to the manufacturer members in the near future. Its purpose is to provide machinery by means of which the manufacturer members of the American Association may be able to perform certain definite functions for the benefit of the industry.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## New York Women Protest

### Consider Recent Legislation Fixing Their Hours a Grave Injustice—Companies Do Their Best

Results unexpected, at least in some quarters, followed closely the signing of the Lockwood bill by Governor Smith of New York. This measure, referred to in the ELECTRIC RAILWAY JOURNAL for May 17, page 978, prohibits the employment of females under twenty-one years of age on electric railways and provides that no female shall work before 6 o'clock in the morning or after 10 o'clock at night, nor more than nine hours a day for six days a week and must be allowed one hour for meals.

### UNEXPECTED RESULTS FOLLOW

It is said that the sponsors of the bill had in mind the protection of the conductorettes. However that may be, the immediate effect of the bill was to militate, more particularly in Brooklyn, against women ticket sellers, many of whom have been in the service of the Brooklyn Rapid Transit Company from ten to more than twenty years. Evidently the Governor was cognizant of the fact that the bill would affect some of the women seriously, for in giving his approval to the measure he said that he regarded it as a matter of State duty to protect the health and provide for the welfare of women and minors who must work.

No sooner had the measure become law than the rumor mongers got busy. In their minds the newspaper reporters in about three days discharged from railway service in Greater New York more women railway employees than had been in the service of the companies since the first woman was put to work. Accounts also appeared in the papers of meetings of protest which if they could be believed would certainly fix forever as a fact the assertion that hell hath no fury like a woman's tongue.

### FACTS, NOT FANCIES, IN BROOKLYN

The facts, however, so far as Brooklyn is concerned, are contained in the letter of Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to Lewis Nixon, Public Service Commissioner. This letter, dated May 21, stated that out of a total of 1500 women affected by the new law only fifty-two had actually left the service through resignation induced by the curtailment of their hours of service, and that no women have been discharged. Mr. Garrison said:

> The company has endeavored in every way possible to retain all the women employees that it is possible to retain and still comply with the law.
>
> A little consideration will lead to the conclusion that it is impracticable in the operation of an electric railway to comply with this act and retain the women in their present employment, shifting them, not in accordance with any rules of seniority, or in any way to fit in with the proper operation of the system, but in a way to discriminate against the men and in favor of the women, which would quickly cause us to lose all of the experienced and long-service men employees of the company.
>
> We could not, as the law requires, work the women during the daytime the consecutive hours required by the law. We have endeavored in every way possible to retain all women employees that it is possible to retain and still comply with the law.
>
> On the elevated and subways the law affected the following number of employees: Guards, 326; car cleaners, 52; ticket agents, 1026, and porters, 38, totalling 1442.
>
> In respect of the 326 women guards, we have not discharged any, but we are only able to afford these women the number of working hours of from three to five hours in length at the hourly rate for such labor, as against an average of nine hours with the hourly rate which they have heretofore enjoyed. Of these 326 women guards, fifty do not care to work the shorter hours and have resigned. None have been discharged. Eventually, it seems to me, they will all resign because the number of hours we can give them will not, at the hourly rate, afford them sufficient remuneration to make it worth their while to stay.

The New York Railways, operating in Manhattan and the Bronx, is negotiating with the State Industrial Commission as to what course it must take with its present women employees. In the meantime it has stopped the engagement of any new ones.

## Council Approves Chicago Bills

The City Council of Chicago, Ill., on May 19 gave unanimous approval to four bills which had previously been sent to the State Legislature to provide enabling legislation for the solution of the local transportation problem. While it is expected that the Legislature will not be in session many weeks more it is hoped that with all interests united behind the proposed laws the measures will be passed. The City Council will then have time to work out a new ordinance with the companies and the way may be paved soon for unification of the surface and elevated roads and the construction of subways.

One of the bills filed in the Legislature is designed as the basis for a service-at-cost franchise. This seeks to amend section 12 of the State public utilities act as follows:

> The charges fixed for the service rendered by it by means of any such public utility by any city shall be high enough to produce a revenue sufficient to bear all cost of maintenance and operation and to meet interest charges on bonds and certificates issued on account thereof and to permit the accumulation of surplus or sinking funds to amortize, in whole or in part, outstanding bonds and certificates, and to provide and maintain special funds for maintenance, repairs, renewals and depreciation, and for damages, insurance, emergencies and other similar purposes. Any such city shall have power to contract with the holders of such certificates or with any trustee for the benefit of said holders that it will so fix said charges.

## Windsor Strike Settled

### Men Decide to Return to Work at Old Rates Until Voters Pass on Fare Increase

After having called for 200 militiamen to quell the strike of trainmen on the Sandwich, Windsor & Amherstburg Railway, Mayor E. B. Winter of Windsor, Ont., and officials of the other border towns were successful in bringing the striking employees and company officials together in negotiations which resulted in the resumption of service on all lines. Troops were called by telegram after the company had made an unsuccessful attempt to run cars manned by strikebreakers. No serious rioting was in evidence, but in many cases the strikebreakers were induced to desert the cars and join the strikers.

### SERVICE ORDERED RESUMED

The Dominion Railway Board ordered service resumed. After the men voted to return to their cars at the regular wage scale until the electors voted on a by-law allowing the company an increase in fares, the officials of the railway consented to compromise.

All strikers will be re-employed, including officers and agents of the union discharged just prior to the beginning of the strike. The men will get the increase in wages asked for provided the by-law is passed allowing the company to charge a 5-cent fare with 1 cent for each transfer issued. On the other hand, the men yielded in their demand for recognition of the union and the forced resignation of Superintendent Hayes.

Under the present agreement the railway sells six tickets for a quarter and issues transfers free. If the increased rate of fare is allowed by the voters, the men will be paid a minimum wage of 40 cents an hour during the first six months of service and a maximum of 50 cents.

### VOTE ON FARE BY-LAW

Although members of the Councils of the various border municipalities concerned favor allowing the company to charge the increased fares, a difference of legal opinion regarding the right of the Councils to grant the increase led to the decision to submit the by-law to the voters of Windsor, Walkerville and Sandwich on June 14. In municipalities where the company operates without franchise, no action will be taken by the electors on the question of the proposed increase in fares. The railway is controlled by the Detroit United Railway. It operates 41 miles of road.

# Buffalo Still Up in the Air

### Governor Vetoes Local Service-at-Cost Plan Because He Favors State Commission—Meanwhile City Puts Commission Power Over Rates Up to Court of Appeals

Governor Smith on May 16 vetoed the bill to permit the city of Buffalo, N. Y., and the International Railway to agree upon a service-at-cost plan. He took the position that the bill did away with the control which the State had spent years in establishing. In expressing his disapproval Governor Smith said:

> The contract, if this proposed statute be valid, once made, can only be altered by the joint consent of the parties, viz., the city and railway, and the bill provides that all acts or portions of acts not consistent therewith, including the provisions of the railroad law and the public service commissions law, shall have no application to said city, or to any company or companies, parties to the contract hereby authorized.
>
> This measure thus in effect abrogates all authority or control now exercised under the laws of the State over the International Railway, not only in the city of Buffalo, but for that large area of surrounding country in which it operates. Regulatory powers are taken from the Public Service Commission and are allowed to be a matter of contract between the railway and the city, which contract can only be altered or amended by the consent of the railway.

The proposed bill had been passed by the Legislature at Albany, and the taking of evidence by three arbitrators chosen to determine the amount upon which an agreement might be based had been completed. The valuation work done now appears to be useless unless the arbitration commission should go ahead and submit findings for possible future use.

#### ONE AVENUE MAY BE OPEN

There may still be one means of relief for the International Railway through a revision of fares by the Public Service Commission for the Second District. The opportunity arises through a case before the commission which involves a matter of law that has now been taken by the city to the highest State court, the Court of Appeals. The company had promised that it would make no effort to secure a rate decision from the commission pending the outcome of the arbitration proceedings, but Governor Smith's veto apparently has reopened the company's side of the matter.

The case in question got into the courts through the refusal of the commission to receive the answer of the International Railway to a rate complaint filed with the commission several years ago by the municipal authorities. At that time the city wanted the 5-cent fare reviewed with the aim of getting a 3 or 4-cent fare in Buffalo. The company, however, secured an injunction prohibiting the commission from hearing the case because of the provisions of the Milburn agreement between the city and the company.

For almost four years the case was idle until the company sought to renew the negotiations by seeking to file an answer and inviting the commission to make an investigation to determine an equitable rate of fare. The city sought to withdraw its complaint, and the commission refused to receive the company's answer. Recently, however, Justice Rudd of the New York Supreme Court granted a writ of *mandamus* directing the commission to receive the company's answer.

The city immediately took an appeal to the Appellate Division of the Supreme Court, which last week handed down a decision sustaining the company. Inasmuch as the proceedings by stipulation were amended so as to treat the case as one of *certiorari* rather than *mandamus*, the Appellate Division annulled the determination of the Public Service Commission and remitted the proceedings to it for consideration. It gave leave for an appeal to the Court of Appeals and certified the following question—Has the commission jurisdiction and power, under the facts shown, to regulate the rate of fare to be charged? The city of Bucalo has made the appeal, and the case will be argued at the present term.

These proceedings have to do with the urban rates of the International Railway. They should not be confused with contemporaneous proceedings regarding interurban rates, over which, as noted elsewhere this week, the commission has just been held by the Supreme Court to have the power of regulation.

# Pittsburgh Strikers Return

### Receivers Gain Their Point — Pitiless Publicity of Receivership Proceedings in Courts Drives Company's Plight Home to Public

The strike of the platform employees of the Pittsburgh (Pa.) Railways, declared on May 14, came to an end Sunday afternoon, May 18. The demand of the men for a raise of 12 cents an hour from the present scale of 43, 46 and 48 cents is to be heard by the War Labor Board. The decision of that body will be subject to review by the United States District Court, under which the receivers of the railway are operating.

This settlement is almost exactly that proposed by the receivers after the court had declined, on May 13, to consent to arbitration before the War Labor Board, the results of which should be binding on the court. The officials of the union had insisted that before they would enter arbitration they must have assurance that any award made in their favor would be accepted by the receivers and the judges. The court, ruling upon this demand, on receipt of a petition of the receivers for instructions, held that it could not grant the demand as such action would amount to delegating part of its constitutional and statutory authority to a non-judicial agency, the War Labor Board. Whereupon the union officials called the men out, although the receivers again offered to submit the question to the Labor Board, the award to be subject to judicial approval.

#### LABOR DEPARTMENT CALLED IN

On the afternoon of May 17, after the men had been out two and a half days, the executive committee of the union in a conference with the receivers arranged by representatives of the State labor department, agreed to submit to the men a proposal that the strike be lifted and their demands heard by the War Labor Board. It was to be understood the court would review the decision of the board and that if it should reject the award or fail to act upon it within twenty days after receiving it, the union would have the right to strike again. Any award in favor of the men was to be retroactive to May 1.

The proposal was voted upon at a union meeting on Sunday afternoon. It passed with a shout. Within an hour the first cars were on the streets and by midnight service was about normal.

The demands of the men are now up to the War Labor Board, an application for a hearing having been filed on May 14 by Receiver C. A. Fagan and Attorney George E. Alter, of counsel for the receivers. The outcome of these proceedings is being awaited with intense interest in view of the possible wide effect they may have. The present scale in Pittsburgh is one the War Labor Board established as practically a uniform rate of pay. Now the men ask a 25 per cent increase. In some quarters this is taken to mean that a wave of similar demands will follow all over the country if the Pittsburgh employees are successful in their demands before the board.

#### MEN SAY THEIR CASE IS DIFFERENT

The Pittsburgh men, however, maintain that they intend to plead a special case before the board, based upon the argument that living costs are so much higher in Pittsburgh than elsewhere that what constitutes a living wage in any other city cannot be so construed in Pittsburgh. In support of this they are collecting cost data among themselves.

The position of the receivers before the board will be that the Pittsburgh Railways cannot pay the men more at the present 5-and-7-cent-areas tariff. They will show that not only has the company defaulted in its bond interest, but that it is indebted for materials bought long ago and altogether unable to meet the demands of local and State authorities for service.

Any mention of an increase in fares in Pittsburgh is a signal for a storm of protest. Not once during the strike did anyone connected with the railway even hint at such a possibility. When this matter was put up to the receivers by newspaper reporters the receivers would simply lift their hands.

The Pittsburgh public never before, hwever, has been so near an undersnding of the difficulties of the railwy. Thanks to the publicity attendat upon receivership proceedings, wich load the papers with so much ction news that the readers are fced to absorb some of it, a large sectn of the public realizes how things snd, This probably accounts for the neral coolness toward the cause of t strikers, manifested during the suspnsion of service. Everyone was griml aware that any raise to the men smed certain to be paid for directly b the riders.

Business was disarranged much less b this strike than by previous ones. Te steam railroads and improvised ato buses did surprisingly well in spplying transportation in the emerncy.

## Employees Favor Company Participation

At a special election held on May 3 nmbers of the Employees' Benefit Assiation of the Brooklyn (N. Y.) Rpid Transit Company voted down a nber of proposed amendments to the cstitution and by-laws of the assotion, the result of which, if carried, wuld have been entirely to dissociate management of the association fm the management of the Brooklyn Rpid Transit Company.

The outcome of the election leaves organization of the Employees' Bnefit Association as previously contuted, and continues, for the time bng at least, the close relations beeen the company and the association. John F. Porter, chairman of the rd of departmental trustees, surface nsportation department, commenting the opposition to the amendments veloped by the vote, said:

> The outcome of the election was not at surprising to the older employees and er association members of the surface artment, nor was it particularly surpristo association members of upward of year's standing. The fact is the men we satisfied with the association as it s, and as it is, and they were not dised to do anything so radical as would be plied in the step of taking the associan entirely out from under the jurisdicn of the management of the company turning it over to purely elective offis.
>
> The association has prospered as it has n conducted during years past and all benefits have been regularly paid; its taurant service and other services to ployees have been maintained regardless whether they were actually self-sustainor not; and a handsome surplus has umulated in the association treasury.
>
> The amendment providing that each nber of the association who, in addito his regular dues, paid the sum of cents a month would be given a life inance policy for $1,000 under the comy's group insurance plan, of course, conuted a strong attraction, but not, apently, sufficiently strong to induce the nbership to launch forth on a career ependent of the company when its past eer, under the guidance of, and in ndly co-operation with, the management proved so successful.

Following the inquiry of the War por Board into conditions of empyment on the lines in Brooklyn that brd reported that the Employees' Bnefit Association was dominated by t management. The company later anounced that it was prepared to comply with the recommendations of the board to remove all company control over the association. The vote of the members of the association on May 3 puts the employees formally on record as opposed to the plan to make it impossible for the management to take an interest in the affairs of the association.

## M. O. Bill Passed

The people living in the communities bordering the route of the Taunton, Norton & Attleboro Street Railway may provide for the maintenance and continuance of the road, according to a bill which has passed the Legislature of Massachusetts.

The bill gives the cities of Taunton and Attleboro and the towns of Mansfield and Norton the right to purchase and hold shares in the road to such an amount as the Public Service Commission may determine or may purchase or take by right of eminent domain the tracks, poles, trolley, feed and stay wires or other property of the company. This they may do either jointly or each may act independently.

It is necessary in the case of the towns of Norton and Mansfield that two-thirds of the residents of each town gathered in special town meeting called for the purpose within five years shall vote in favor of the action. A two-thirds vote of the Council in Taunton and Attleboro is necessary for the action to be legal in those cities.

Each of the communities is authorized under the act to borrow money outside the legal debt limit. The bill has been examined by leading residents of the cities and towns interested and has met with general approval.

## Relief Bills Still Under Consideration

Measures looking toward the relief of Massachusetts electric railways along financial lines are still held up in the Legislature, which bids fair to continue its present sitting for at least a month or two more.

The Bauer bill providing for the acquisition and operation of the lines of the Bay State Street Railway in Lynn by that city, and furnishing free transportation therein, has been given leave to withdraw by the committee on street railways.

Attempts to prevent the Boston Elevated Railway from giving the zone-fare system a trial have failed in the present session.

The bill sponsored by C. V. Wood, president of the Springfield Street Railway, and providing that cities and towns be enabled to extend financial aid to railways, is still in committee.

A favorable report has been presented on an order requesting the trustees of the Boston Elevated Railway to furnish the Legislature with a statement of the company's financial condition when public management began and on Jan. 1, 1919, together with a valuation of the property of the company as of the latter date.

## Random Shots from Seattle

Service on the municipal elevated line in Seattle, Wash., long awaited as a means of expediting transportation to and from the big industrial district in the South End, cannot be inaugurated for at least two months, according to the city engineering department. It is now considered likely that the service will be delayed until Aug. 1. The trestle viaduct, with tracks, overhead wires and all other construction necessary is completed, but the connections with existing tracks at either end of the trestle have not been finished. The postponement is caused by the delay in obtaining material for the special work.

A bill recently introduced in the City Council, and referred to the finance and city utilities committees, provides for a bond issue of $790,000 for extensions and betterments to the municipal railway system. Two bills were also introduced which provide for limiting the issuance of bonds under two different ordinances for railway extensions. One limits to $100,000 bonds planned under an ordinance which provides for $125,000 of bonds. The other limits to $550,000 a bond issue authorized for $1,200,000. All these bills were referred to the finance and city utilities committees.

Thomas F. Murphine, superintendent of public utilities, favors the construction of a railway extension up Thirty-fifth Avenue Southwest, if the residents of that district will make a proposition to the city to buy the utility bonds which must be floated to finance the enterprise. The extension is estimated to cost $60,000. It will serve a large district that is now without adequate railway facilities.

Mr. Murphine has ordered placards placed in all the municipal cars, notifying the public of the ordinance regulating the conduct of passengers. The ordinance makes it a misdemeanor to smoke on cars, enter the car except through the gates, refuse to pay fare, attempt to use a transfer to which one is not entitled, throw refuse on the floor, etc. The penalty is a fine of not more than $100, or not to exceed thirty days in jail, or both.

The employees of the Seattle (Wash.) Municipal Railway are to be paid time and a half for overtime, providing the Council as a whole passes an ordinance which the chairman of the finance committee has requested the legal department to prepare. If this ordinance is passed, the threatened railway strike will be averted, and the long-drawn-out controversy between the city and the trainmen will be ended. Following repeated failures to induce the City Council to authorize the payment of overtime at the rate of time and a half, a meeting of railway men was called to discuss the question of a walkout, but it is believed the men will accept the proposed ordinance as a guarantee of good faith. The ordinance will become a law in thirty days, but will be effective from May 15.

## News Notes

**Dallas Supervisor on Traffic Study.**—Lynn B. Milam, supervisor of public utilities of Dallas, Tex., has announced that he will visit New Orleans, Cleveland, Detroit, and other cities for the purpose of studying electric railway operation with a view to increasing the efficiency of the Dallas lines and improving the service wherever possible.

**Mayor Vetoes Franchise.** — Mayor Edward Parks of Warren has vetoed the ordinance granting a twenty-five year franchise to the Mahoning Valley Railway, included in the system of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, on the grounds it does not permit the Council to go before the Public Utilities Commission on that and other questions which concern the community in general.

**Jail Sentence for Gouging Railway.**—On a charge of selling coal to the Richmond Light & Railroad Company, Richmond, Staten Island, N. Y., at a price above the government's fixed figure, a coal operator of Formania, W. Va., was sentenced to sixty days in jail and fined $2,500 in the United States District Court at Baltimore recently. The indictment recited that the dealer had sold the Richmond company 2643 tons of bituminous coal on Aug. 30, 1917, at $2.90, when the price, under the Presidential order, should have been $2.

**Buses for Detroit.** — Double-deck motorbuses, similar to the Fifth Avenue buses in New York City, will be in operation in Detroit before the end of this summer, according to Richard W. Meade, former president and general manager of the New York Coach Company, now president of the Detroit Motorbus Company. The company will operate under the ordinance of March 26, 1918, licensing motorbuses, and under present plans of the corporation, which will be financed and directed by Detroit men, the first fleet of probably twenty buses will give service in Jefferson Avenue, with one terminal at the Campus Martius and the other near the plants of the Hudson and Chalmers Motor Car Companies, with a later extension to Grosse Pointe.

**Rhode Island Employees Wait.**—The threatened strike of the employees of the Rhode Island Company, Providence, R. I., unless payment of the back wages due them was made on May 3 did not materialize, owing to the decision of the union officials in conjunction with the receivers of the Rhode Island Company to wait for the expiration of the thirty-day period in which appeals from the decision of the court might be taken. The employees voted overwhelmingly in favor of the drastic action, but the time of calling the strike was left in the hands of the officers of the union and the latter were convinced of the advisability of deferring positive action until the expiration of the time allowed by law for the filing of appeals. The receivers advised the union leaders that immediately upon the expiration of the thirty-day period the wages, payment of which was ordered by the court, would be promptly distributed.

**Wages Before Utility Commission.**—Wage demands of the organized employees of the United Railways, St. Louis, Mo., will be submitted to the Public Service Commission of Missouri as a board of arbitration. The men will not suspend work. This was decided by vote of motormen and conductors. The plan is in accordance with the suggestion of Rolla Wells, receiver for the railway, who on May 5, in reply to demands of the employees for an increase, stated the financial conditions of the company would not permit higher wages and suggested the union take the matter up with the Public Service Commission, pointing out that the commission could empower the United Railways to increase its fares and thereby create revenue to provide for an increased wage. After considering the letter from Receiver Wells the executive committee of the union decided to submit the matter to the international body. This was done. Mr. Mahon recommended that the men accept the proposal of the receiver.

## Programs of Meetings

### Important Hearing in Washington

The public utilities committee of the United States Chamber of Commerce will hold its second electric railway hearing in Washington, D. C., on May 28 and 29. The hearing will be opened at 10 a. m. in the Riggs Building.

Those who are expected to be present to give testimony in regard to various factors in the present electric railway situation include the following: Charles E. Elmquist, president National Association of Railway and Utilities Commissioners; Fielder Sanders, street railway director, Cleveland, Ohio; Halford Erickson, of Hagenah & Erickson, Chicago, Ill.; L. R. Nash, Stone & Webster, Boston, Mass.; W. C. Culkins, street railway director, Cincinnati, Ohio, and Walter A. Draper, vice-president Cincinnati Traction Company.

### New York Electric Railway Association

The annual meeting of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, on Saturday, June 7. The business session will begin at 10 a. m. and two topics will be discussed.

The first will be the fare situation in New York State with particular reference to the extent to which the decision in the South Glens Falls case and the recent decision by Judge Hinman in the International Railway case affect the rule of practice as laid down in the Quinby case. The subject will be introduced by Morris Cohn, Jr., of Cohn Chormann & Franchot, attorneys for the International Railway in the rate case mentioned.

The second subject is the attitude o the State Industrial Commission on self-insurance under the workmen's compensation law. The principa speaker on this subject will be O. G Browne, assistant secretary of the Self-Insurers' Association.

The annual banquet will be held a 7 p. m. The speakers will include Jo Hedges, receiver of the New York Railways, Brig. Gen. Frank T. Hines chief Transportation Service Unite States Army, and Dr. Frank Buffingto Vrooman, who will speak on "Big an Little Bolsheviks."

The entertainment committee of the New York Electric Railway Association has arranged for the use of the Glens Falls Country Club, which i located about 3 miles south of the Fort William Henry Hotel, by the association members on Friday afternoon June 6, Saturday, June 7, and Sunday June 8. Association members will be admitted to the club house and grounds by showing their badges.

The Hudson Valley Railway wil transport members of the association between Lake George and the Country Club free of charge, the association badge being their means of identification to the conductor in charge of the train.

Motor boats will be provided for the use of the ladies who desire to make trip on Lake George.

Automobiles will be furnished for trip on the Bolton Road which runs along the west side of Lake George from the Fort William Henry Hotel t the Hotel Sagamore grounds.

A victory championship basebal game will take place on the afternoon o June 7 at 2 o'clock on the hotel grounds between the railway and supply men.

Arrangements have also been mad with the management of the hotel fo dancing on Friday evening, June 6, an after the dinner on Saturday evening June 7. Card games have been arranged to take place in the hotel in the event of inclement weather on Saturday afternoon.

In addition the association has secured the services of Robert Perkins t sing during the banquet. Other talen will also be provided. A special ca from New York direct to the convention will leave Grand Central station a 12.25 a. m. on June 7 and will arriv at the Fort William Henry Hotel i time for the morning session. Thos desiring accommodations on this ca should make applications promptly t W. G. Kaylor, Westinghouse Tractio Brake Company, 165 Broadway, Ne York. After arrival at Lake Georg delegates will make their own arrangements for returning, but the transportation committee states that if ther is sufficient demand for a car to leav Lake George Saturday evening afte the banquet, one will be run.

# Financial and Corporate

## Hard Year in Jersey

### ublic Service Corporation Suffered Further Loss in Net Because of Operating Costs

Serious as were the burdens of utility eration during the calendar year 17, they were as nothing to those countered in 1918. Such is the sum-ary of the last year's experiences as ven in the 1918 annual report of the ıblic Service Corporation of New rsey, Newark, N. J.

The operating revenue of the electric ilway, electric light and gas subdiaries increased $5,706,496 or 12.1 er cent during 1918. The operating xpenses, however, including amortiza-on charges and taxes, rose $6,399,015 20.9 per cent. The non-operating icome showed a substantial gain, but e net result for the subsidiaries was a loss of $638,398 or 13.1 per cent in net income. The final result for the combined 1918 holding company and subsidiary returns was a net income of $1,820,430 as compared to $2,377,399 in 1917. Dividends at 6 per cent aggregating $1,799,976 were paid in 1918 as compared to dividends at 8 per cent aggregating $2,399,968 in 1917.

NCOME STATEMENT OF PUBLIC SERVICE CORPORATION OF NEW JERSEY FOR CALENDAR YEAR 1918

| | | |
|---|---|---|
| perating revenue of subsidiary companies.... | .......... | $52,997,838 |
| Operating expenses and taxes.............. | $33,824,826 | |
| Amortization charges... | 3,113,558 | 36,938,384 |
| perating income.................... | | $16,059,454 |
| Non-operating income... | .......... | 472,518 |
| ross income............ | .......... | $16,531,972 |
| Income deductions of subsidiary companies (bond interest, rentals and miscellaneous interest charges)....... | .......... | 12,320,529 |
| et income of subsidiary companies............ | .......... | $4,211,443 |
| Public Service Corporation income from securities pledged (exclusive of dividends on stocks of operating companies) and from miscellaneous sources. | $2,040,242 | |
| Less expenses and taxes............. | 148,575 | 1,891,667 |
| | | $6,103,110 |
| ublic Service Corporation income deductions: | | |
| Interest on perpetual interest bearing certificates............... | $1,203,046 | |
| Interest on Public Service general mortgage 5 per cent bonds...... | 1,875,000 | |
| Interest on 5 per cent collateral notes....... | 375,000 | |
| Interest on miscellaneous obligations.......... | 551,214 | |
| Amortization of debt discount and expense.... | 233,050 | |
| Other contractual deductions from income.... | 45,370 | 4,282,680 |
| Net income of Public Service Corporation and subsidiary companies. | .......... | $1,820,430 |
| Appropriation accounts of subsidiary companies: | | |
| Amortization of new business expenditures prior to Jan. 1, 1911............... | $40,330 | |
| Adjustments of surplus account........... | 376,129 | 416,459 |
| | | $1,403,971 |
| Appropriation accounts of Public Service Corporation (exclusive of dividends)—credit.... | .......... | 1,258,325 |
| Net increase in surplus before payment of dividends............... | .......... | $2,662,296 |

In 1918 the operating revenues of the railway subsidiaries increased $1,437,736 or 7.4 per cent. Full details regarding operating expenses are not given in the annual report. The number of passengers carried dropped from 476,974,983 in 1917 to 451,220,806 in 1918, or 5.4 per cent. The company had a 1-cent charge for transfers which went into effect on Aug. 1, and a 7-cent fare in addition which became effective on Oct. 15.

The increase in railway revenue between Oct. 15 and Dec. 31, 1918, during which period of time the 7-cent fare with a 1-cent charge for a transfer was in operation, was 22 per cent as compared with corresponding period of the previous year. This confirmed almost exactly, it is said, the predictions and estimate of the officers of the company in their testimony before the Board of Public Utility Commissioners in the rate case.

The effects of the fare increases, besides the traffic decline, were an increase in the average fare per passenger from 3.82 cents in 1917 to 4.31 cents in 1918 and an increase in passenger receipts per car mile from 32.44 cents in 1917 to 36 cents in 1918. Miscellaneous statistics follow:

| | 1918 | 1917 |
|---|---|---|
| Revenue passengers...... | *353,190,897 | 361,187,782 |
| Transfers and passes..... | 98,029,909 | 115,787,201 |
| Total passengers......... | 451,220,806 | 476,974,983 |
| Percentage of passengers using transfers......... | 20.0 | 21.9 |
| Average fare per passenger (cents)............. | 4.31 | 3.82 |
| Car miles................ | 54,039,150 | 56,087,403 |
| Car hours................ | 5,698,089 | 6,021,225 |
| Passengers per day...... | 1,236,221 | 1,306,781 |
| Passenger receipts per car mile (cents)........... | 36.00 | 32.44 |
| Passenger receipts per car hour (dollars)......... | 3.41 | 3.02 |

* Excluding passengers paying for transfers.

There has been an increase in the number of jitneys in the cities served by the Public Service Railway and in the volume of business done by these vehicles. In regard to this matter the annual report says:

> No such competing service should be allowed, certainly without being obliged to obtain from the same board that has jurisdiction over the railway a certificate of public necessity for its existence. This question sooner or later will have to be determined as a matter of State policy. In almost every other State the question has been fairly met, the State policy decided and the existing electric railway systems protected from the competition of irresponsible jitney traffic. The people of New Jersey must eventually realize that if the jitney traffic is to be fostered and encouraged, the inevitable result will be higher rates for the public to pay upon existing electric railway systems and a stagnation in their future development.

The railway claim department in 1918 spent $986,039, amounting to 5.11 per cent of the gross receipts. This was a much larger sum than was expended for similar purposes the year before, but war conditions account for the increase. Steam railroad congestion added immeasurably to street traffic, owing to the more general use of motor trucks; the labor turnover was responsible for an abnormal number of inexperienced men, and mounting costs of labor and material were directly reflected in the expenditures for repairs of vehicles damaged in accidents.

The net expenditure charged to the fixed capital accounts of the various subsidiaries in 1918 amounted to $4,639,907. Of this amount $1,403,848 was for the railway department.

## Leases Terminated

### Rhode Island Contracts Set Aside—Further Hearing to Be Held on May 28

Leases under which the Rhode Island Company, Providence, R. I., operated the electric railways of the State have been declared terminated on April 21 by Presiding Justice Tanner in the Superior Court of Rhode Island, the companies affected being the Rhode Island Suburban Railroad, the Pawtucket Street Railway and the Union Railroad, all of which are owned by the United Traction & Electric Company.

The court also ordered the receivers of the Rhode Island Company to pay $50,000 on account to the lessor companies, to which upward of $330,000 is now owed by the Rhode Island Company for rentals. May 28 was set for a further hearing on electric railway affairs and on that date the principal issue will be the appointment of a master to determine what properties belong to the lessor companies and what to the Rhode Island Company.

No desire was expressed by the counsel for the lessor companies actually to take over property leased to the Rhode Island Company, inasmuch as it is to the benefit of the lessors to have their properties operated by the Rhode Island Company receivers rather than not operated at all. The lessors petitioned the court so that the leases by their terms might be formally terminated, enabling the lessors to protect their interests by determining what property belonged to them and arranging for return of such properties in case the Rhode Island Company is reorganized or some other distribution made of the lines.

The Rhode Island Company failed to pay rentals due the lessors between the dates of Jan. 30, when a temporary receiver was appointed, and April 21. Under the terms of the leases this failure to pay forfeited the leases. Meanwhile the receivers will retain possession by consent until May 28 at least, and later on new leases may be drawn.

### Jersey Tax Valuations Announced

Utility corporations in New Jersey this year, consisting of 294 corporations and three individuals, will pay municipal franchise taxes amounting to $2,991,334, an increase of $722,387 over the assessment levied in 1918.

In the group of utilities there are twenty-nine electric railways, paying a tax of $960,910; 114 water companies, $168,974; 100 gas and electric companies, $1,416,029; thirty-five telegraph and telephone companies, $429,249; three district telegraph companies, $3,495, and sixteen sewer and pipe line companies, $12,674.

Previous to the enactment of Chapter 17 of the laws of 1917, the rate of tax levied against all classes of utility corporations except electric railways was 2 per cent. Electric railway corporations were assessed at the rate of 5 per cent of the gross receipts. Under the 1917 act the rate on utilities, other than electric railways, whose receipts are in excess of $50,000 was increased by 1 per cent each year, beginning with 1918, until the maximum of 5 per cent is reached. Therefore, the rate this year for this class of utilities was 4 per cent.

### New York Franchise Tax Held Valid

In an unanimous decision the Appellate Department of the Supreme Court, Third District, recently held that corporations in New York State subject to the franchise tax of 3 per cent, based upon "the entire net income," are not entitled to deduct the amount of tax paid to the federal government on account of excess profits before computing the amount payable to the State.

With respect to the State statute, the court said:

> This is not an income tax; it is a franchise tax. It is a tax for the privilege of doing business in a corporate form in the State of New York, and the only relation of the federal act to the statute of New York is the basis for the computation of the State tax.
>
> The State franchise tax thus assessed bears equally upon every like corporation within New York. It does not constitute a double franchise tax, though the national government makes use of the same foundation in levying an income tax.

The original ruling of the State Tax Commission, that no deduction of federal taxes would be allowed in computing the 3 per cent franchise tax, is thus sustained.

### Only Five Legal Investments

Each year the Massachusetts Public Service Commission transmits to the bank commissioner a list of electric railway lines in Massachusetts whose bonds are legal investments for savings banks, they having annually earned and properly paid, without impairment of assets or capital stock, dividends equal to at least 5 per cent on their outstanding capital stock in each of the preceding five years.

This year the list is the smallest on record, containing only five companies, out of a possible fifty-four companies operating in the State. This compares with seven last year and nine the year before, while in 1913 the number was thirteen. Among the eight companies that have fallen by the wayside in the last half dozen years are the Bay State Street Railway, Worcester Consolidated Street Railway and Springfield Street Railway.

Although the Boston Elevated Railway is paying the dividends prescribed, this is being done under State guaranty. The road is not earning the dividends.

### New Officers for Iowa Southern Company

David G. Fisher, head of David G. Fisher & Company, public utility engineers of Davenport, Ia., was elected president of the Iowa Southern Utilities Company at a reorganization meeting of the board of directors on May 15, a meeting which marked the formal change in financial control of the utility.

Mr. Fisher organized his company in 1909 and soon afterward began to purchase and operate public utility plants. The majority of his holdings have been in Iowa. He secured a minority interest in the Iowa Southern when it was organized in 1916 and purchased control a few weeks ago.

The new officers and directors of the Iowa Southern Utilities Company are:

President, David G. Fisher, Davenport, Ia.
Vice-president, John C. Meiners, Milwaukee, Wis.
Secretary, L. C. Bernhard, Milwaukee.
Assistant secretary, G. E. Peck, Centerville, Ia.
Treasurer, J. C. Johnson, Davenport.
General manager, J. C. Johnson.
Directors, David G. Fisher, E. F. Bulmahn, Davenport; John C. Meiners, John E. DeWolf, Milwaukee; Frank S. Payne, Centerville.

D. C. Bradley and J. P. Bruckshaw, Centerville, who have been directors of the company for many years, retired. Mr. Bradley was one of the organizers of the company. He and Mr. Payne sold control to the Fisher Company.

Extension of the 200 miles of transmission line was decided on at the reorganization meeting. Two additional towns, Shannon City and Tingley, Ia., are to be added this summer to the thirty towns already furnished with electric power. This extension will be approximately 20 miles long and will be run from Diagonal, Ia.

### Wants P. R. T. to Lease Line

As a solution to the trouble between the residents of the northeastern section of Philadelphia and the Frankford, Tacony & Holmesburg Railway, relative to the complaints of inadequate service, antiquated and poorly ventilated cars, the proposition has been made that the line be operated by the Philadelphia Rapid Transit Company. A. Howard Jones, an engineer connected with the commission, said he had conferred with President Mitten and G. A. Richardson, superintendent of transportation of the Philadelphia Rapid Transit Company, regarding leasing the railway and had submitted a proposition to the company, which is now being considered.

## Financial News Notes

**Receiver for Colorado Road.**—George M. Taylor, Colorado Springs, Col., was appointed receiver of the Colorado Springs & Cripple Creek District Railway on May 10 by Judge Robert E. Lewis of the Federal Court, acting at the request of the bondholders' protective committee.

**Formal Application Made.**—Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, made application before Judge Mayer of the Federal District Court on May 15 to approve an immediate issue of $15,000,000 of 6 per cent receiver's certificates maturing on June 1, 1920.

**New Potomac Electric Power Issue.**—The District of Columbia Public Utility Commission has authorized the Potomac Electric Power Company, which is controlled by the Washington Railway & Electric Company, to issue and sell $1,750,000 of general mortgage 6 per cent five-year gold bonds, dated July 1, 1918.

**Bay State Makes Purchase.**—The Georgetown, Ipswich & Rowley Street Railway, sold at auction at Salem, Mass., on May 14, became part of the Bay State Railway system for a $30,000 consideration. I. H. Glidden, Boston, representing the reorganization committee of the Bay State Street Railway, was the only bidder for the road.

**Foreclosure Proceedings Started.**—Foreclosure proceedings against the New Orleans Railway & Light Company, New Orleans, La., for collection of interest on an issue of $6,500,000 gold mortgage bonds, payable on May 1, have been filed in the United States District Court at New Orleans by the Empire Trust Company, New York, as trustee for the mortgage.

**Sold Under Foreclosure.**—The Selma (Ala.) Street Railway was sold under foreclosure recently to the Selma Electric Railway, of which D. L. Gerould, Warren, Pa., will be president. W. E. Nees will remain the superintendent of the company and will have general charge of operation. Hugh Mallory will represent the stock and bond holders and will be managing director.

**St. Petersburg Line Reported Sold.**—The St. Petersburg & Gulf Railway, St. Petersburg, Fla., in the hands of receivers since May, 1918, is reported to have been sold to a syndicate headed by Messrs. Beeching, Webster and Disston, Philadelphia, Pa. The superintendent of the road is L. J. Wells, the superintendent of construction is J. S. Wilders, and the master mechanic is Edward Morton.

**Subsidy Approved.**—The Massachusetts Public Service Commission has approved the action of the town of

Swansea in voting to give $1,825 to the Swansea & Seekonk Street Railway. The sum represents a tax of $1 for each $1,000 of assessed valuation. The road was formerly known as the Providence & Fall River Street Railway. It was sold for junk in 1917, but escaped being scrapped when citizens along the route raised $80,000 for its purchase.

**Negotiating for Power Plant.**—The Hagerstown & Frederick Railway, Frederick, Md., is reported to be negotiating for the purchase and control of the Northern Virginia Power Company, Winchester, Va. The latter has about 150 miles of transmission lines, the main generating station being at Millville, on the Shenandoah River. The company also has a steam generating plant at Berkeley Springs, W. Va., and a hydro-electric station at Capon Springs, W. Va.

**Sale for Taxes.**—On June 2 various parcels of real estate and personal property belonging to the Rhode Island Suburban Railway and the Union Railroad, Providence, R. I., will be sold to settle claims of the city for unpaid taxes due on July 29, 1918. The levy upon the property was made by City Treasurer Lee and is one of many made against property upon which assessed taxes remain unpaid. The Rhode Island Suburban Railway owes the city $6,387 with interest and the Union Railroad is required to pay $8,391 with interest.

**Sale of Lorimer Road June 10.**—Attorney John E. Hamlin, master-in-chancery of the St. Clair County Court and attorney for the receivers of the Southern Traction Company, East St. Louis, Ill., has been ordered by Federal Judge George W. English to sell the right-of-way, rails and all other property of the railway at public sale on June 10. Based upon the report of appraisers appointed by the court a minimum price of $300,000 is fixed on the property. Claims aggregating $1,500,000 are pending against the company, and of this amount the principal items are held by the Lorimer-Gallagher Construction Company, Chicago, Ill., of which former Senator Lorimer is the head. The road has been partially completed between East St. Louis and Belleville and right-of-way has been secured beyond Belleville.

**Tucson Receiver Reports.**—Edwin F. Jones, who was recently appointed receiver of the Tucson (Ariz.) Rapid Transit Company, as noted in the ELECTRIC RAILWAY JOURNAL of March 29, 1919, has reported to the court that when he took possession the outstanding capital stock totaled $500,000, and the outstanding funded debt $114,000. The single-track mileage was 4.35 miles. For March, 1919, the gross income showed a gain of $216 over the same month of last year, while expenses rose $572. Some time ago the company secured from the State Corporation Commission the right to increase fares from 5 cents to 8 cents, with a small reduction for quantity sales, and the effects of this order are just beginning to be felt. It has manifestly caused a small increase in passenger revenue at the expense of traffic, the passenger total being 13,319 less in March, 1919, than the year before. It still remains to be seen, the receiver says, whether the public will ride at an 8-cent fare.

**Common Stock Dividend Passed.**—Directors of the Washington Railway & Electric Company, Washington, D. C., on May 15 passed the quarterly dividend of 1¼ per cent on the common stock of the company which would have been payable on June 1. The quarterly dividend of 1¼ per cent on the preferred stock will be paid on June 1 as usual. There is $6,500,000 of common stock, the annual dividend on which at 5 per cent has amounted to $325,000. The company began paying dividends on the common stock in 1909, when 1 per cent annually was paid. The distribution was increased until in 1913 a dividend of 7 per cent was paid. The 7 per cent distribution was continued until last year, when the rate was reduced to 5 per cent. William F. Ham, president of the company, said: "The board, realizing the extremely serious conditions brought about by the failure to receive adequate or sufficient revenues properly to maintain and operate its properties, has adjourned for one week to consider what further steps should be taken properly to conserve the interests of the company."

**Mexico Properties Returned.**—Confirmation has been received in Toronto, Ont., the home office of the company, of the report from Mexico that the Mexico Tramways has been returned to its owners and General Manager G. R. G. Conway has again taken control. Mr. Conway holds a like position with the Mexican Light & Power Company, an allied organization which had not been taken over by the government, and he was, therefore, on the scene ready for the change. The period of government possession of the tramways has been an anxious one for the shareholders, as not only have they received nothing, but the bond interest and charges have been accumulating. The company has received none of the money collected by the government from the operations of the tramways during that time, except a small amount to pay the underlying bond interest of the Mexico Electric Tramways, Ltd. In 1916 joint action was taken by the bondholders of the Mexico Tramways, Mexican Light & Power Company, and the Pachuca Light & Power Company and their subsidiaries to protect the whole situation. As yet the company has not received a full report and does not know the present physical condition of the property. No bond interest or dividends have been paid since 1913, and no annual statements issued.

# Electric Railway Monthly Earnings

### BATON ROUGE (LA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $27,408 | *$17,537 | $9,871 | $3,459 | $6,412 |
| 1m., Mar., '18 | 20,321 | *10,962 | 9,359 | 3,501 | 5,858 |
| 12m., Mar., '19 | 293,231 | *165,753 | 127,478 | 41,920 | 85,558 |
| 12m., Mar., '18 | 236,118 | *123,837 | 112,281 | 38,413 | 73,868 |

### CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $42,924 | *$32,559 | $10,365 | $5,357 | $5,008 |
| 1m., Mar., '18 | 39,516 | *30,124 | 9,392 | 5,254 | 4,138 |
| 12m., Mar., '19 | 533,843 | *403,445 | 130,398 | 63,575 | 66,823 |
| 12m., Mar., '18 | 476,976 | *327,068 | 149,908 | 63,240 | 86,668 |

### COLUMBUS (GA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $95,306 | *$54,970 | $40,336 | $30,279 | $10,057 |
| 1m., Mar., '18 | 96,195 | *41,609 | 54,586 | 27,700 | 26,886 |
| 12m., Mar., '19 | 1,183,546 | *607,239 | 576,307 | 349,882 | 226,425 |
| 12m., Mar., '18 | 1,139,255 | *444,655 | 694,600 | 315,463 | 379,137 |

### EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $106,782 | *$65,676 | $41,106 | $12,972 | ‡$28,258 |
| 1m., Mar., '18 | 87,459 | *49,131 | 38,328 | 11,851 | 26,477 |
| 12m., Mar., '19 | 1,200,367 | *717,750 | 482,617 | 152,209 | ‡332,307 |
| 12m., Mar., '18 | 961,980 | *535,977 | 426,003 | 130,968 | ‡321,104 |

### EL PASO (TEX.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $128,112 | *$89,738 | $38,374 | $7,283 | $31,091 |
| 1m., Mar., '18 | 107,532 | *68,350 | 39,182 | 6,389 | 32,793 |
| 12m., Mar., '19 | 1,308,008 | *926,611 | 381,397 | 81,850 | 299,547 |
| 12m., Mar., '18 | 1,273,511 | *814,316 | 459,195 | 68,571 | 390,624 |

### JACKSONVILLE (FLA.) TRACTION COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $92,738 | *$85,070 | $7,668 | $14,146 | $6,478 |
| 1m., Mar., '18 | 78,899 | *51,080 | 27,819 | 14,139 | 13,680 |
| 12m., Mar., '19 | 992,079 | *796,993 | 195,086 | 177,938 | 17,148 |
| 12m., Mar., '18 | 733,980 | *501,123 | 232,857 | 168,660 | 64,197 |

### NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $277,721 | *$173,290 | $104,431 | $25,237 | ‡$88,777 |
| 1m., Mar., '18 | 299,172 | *173,024 | 126,148 | 25,279 | ‡110,452 |
| 12m., Mar., '19 | 2,894,934 | *1,904,218 | 990,716 | 301,279 | ‡804,437 |
| 12m., Mar., '18 | 2,839,727 | *1,593,416 | 1,246,311 | 310,741 | ‡993,070 |

### PENSACOLA (FLA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $46,047 | *$39,817 | $6,230 | $7,855 | †$1,625 |
| 1m., Mar., '18 | 37,035 | *23,787 | 13,248 | 7,093 | 6,155 |
| 12m., Mar., '19 | 543,028 | *406,592 | 136,436 | 89,310 | 47,126 |
| 12m., Mar., '18 | 380,689 | *229,982 | 150,707 | 81,687 | 69,020 |

### SAVANNAH (GA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $107,843 | *$87,298 | $20,545 | $24,911 | $4,366 |
| 1m., Mar., '18 | 94,377 | *64,355 | 30,022 | 23,278 | 6,744 |
| 12m., Mar., '19 | 1,228,299 | *931,915 | 296,384 | 286,926 | 9,458 |
| 12m., Mar., '18 | 1,019,522 | *683,811 | 335,711 | 273,366 | 62,345 |

### TAMPA (FLA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $106,694 | *$63,502 | $43,192 | $4,547 | $38,645 |
| 1m., Mar., '18 | 92,931 | *50,945 | 41,986 | 4,264 | 37,722 |
| 12m., Mar., '19 | 1,110,354 | *651,856 | 458,498 | 52,258 | 406,240 |
| 12m., Mar., '18 | 995,353 | *573,696 | 421,657 | 49,135 | 372,522 |

* Includes taxes. † Deficit. ‡ Includes non-operating income.

# Traffic and Transportation

## Mayor Opposes Increase

### Louisville Official Against Fare Advance—Railway Plans Economies to Avert Disaster

Mayor Smith of Louisville, Ky., has announced that he will oppose any effort on the part of the Louisville Railway to increase its fares. The Mayor has issued a long statement reviewing the affairs of the company. This he concluded in part as follows:

> So far as the stockholders of the railway company are concerned, some of the arguments advanced are sentimental rather than sound. For instance, it has been urged that widows and orphans depend on the company's dividends for a livelihood. It is not just to compel the less fortunate, who are in greater numbers, to pay increased fares in order to provide dividends for the few more fortunate. It has been further urged by some of the stockholders that they are entitled to a dividend on their stock, and the citizens of Louisville ought to pay it in the shape of increased fares, because the government has increased their operating expenses. This argument is not sound for several reasons.
>
> 1. There will be sufficient income to pay dividends irrespective of the over-capitalization of the company, as shown below.
> 2. The Supreme Court of the United States has established the rule that a corporation is entitled to a reasonable dividend based on a reasonable valuation of its property and that reasonable valuation depends on its reasonable worth and does not depend on some extravagant price that might have been paid for the property nor upon bookkeeping.
>
> It is apparent that originally in 1890, the chief value of the stock was based on the franchise which was given by the citizens of Louisville to the railway, and if it is true that at the present time the railway has so improved its property out of its earnings and so materially added to its assets physically that its present capitalization is fair, it follows that the railway has for many years made enormous profits, when based on a reasonable valuation of its property, according to the rule of the Supreme Court of the United States.
>
> During all of these fat years there was no thought of lowering the fare, but on the other hand, whatever profits were made were used either to give a real value to the securities already issued or as a basis for further stock issues. Therefore, if it has had fat years at the expense of the people of Louisville, it ought not to complain when a lean year arrives; that is, lean only when compared with its large profits in times gone by.
>
> Finally, last fall, the company, in its written memorandum, urged that if the increased fare were allowed, it would only produce an increased revenue of 15 per cent, or about $532,000, but the company probably would need help only for a year or two. It is apparent that the railway does not now need that help, for instead of losing $297,574, the probability is it will gain $438,660. It will be better off by $736,234 than it thought at that time. And when it is further considered that its own expert shows it a way to save $287,300, making a total of $1,023,334, which is the sum by which it will be better off than expected, it is no longer necessary to raise $532,000, which the railway urged was all the increased fare would produce.
>
> For the above reasons, I shall oppose any effort to increase fares.

**T. J. Minary, president of the railway, when asked what steps the company would now take, said he had not yet read the Mayor's statement and could not say what the company would do. Mr. Minary was quoted as follows:**

> The entire matter as to the increased fares is in the hands of a committee composed of John W. Barr, Judge Alex Humphrey, Oscar Fenley and myself, and it is probable we will give out a statement as soon as we have fully digested the Mayor's statement.

Later the railway in a letter to Mayor Smith agreed to his proposal that every effort toward economy and efficiency in management be exhausted before the appeal is renewed for an increase in fares. In a communication to the city railway officials have pointed out many places in the present schedule where duplication of service could be eliminated at a saving, and where service on some of the lines could be reduced. Attention was also called to antiquated provisions of the franchise that require service on some lines that is out of proportion to the need, and co-operation of the city authorities has been asked toward rearranging schedules. The Mayor said:

> I shall assist in every way possible to put into effect the reasonable economies proposed by the railway. I appreciate the splendid spirit of co-operation exhibited in the letter from the company. I am sure the people of Louisville will appreciate it and meet these proposals in the same fine spirit in which they are offered.

## New Fare Schedule Allowed

The Public Service Commission of Massachusetts, on May 14, decided to allow the new schedule of fares of the Massachusetts Northeastern Street Railway, Haverhill, Mass., to become effective. The new schedule provides for a 10-cent cash fare or a 6-cent ticket fare in lots of five for 30 cents. The present cash fare is 6 cents, so that the new schedule does not represent an increase if tickets are used by the patrons of the road. The commission suspended the new schedule until May 15, but David A. Belden, president of the road, announced on May 15 that the schedule would not be put into operation until May 19.

No changes are made in any of the zones, or in any of the tickets at present in use. The new tickets will be obtainable from conductors on the cars and are good at all times. In case a conductor runs short of tickets a passenger will pay the 10-cent cash fare and will be given a 4-cent rebate check by the conductor. This rebate check will be redeemable.

Because of the question raised at the public hearing on the new schedule regarding school tickets, the schedule has been changed so that tickets for school children will be sold at one-half the ticket fare, or 3 cents. For resort and park riding, special blocks of tickets will be made up at the 6-cent rate and will be obtainable from the company offices and agents, so that a passenger can purchase a strip of tickets good for a round-trip passage to any park or summer resort without having extra tickets left over.

## Fare Case Still in Courts

### Ottumwa Company Plea for Justice on Fares Before Supreme Court of Iowa

The Supreme Court of Iowa had not at last report rendered a decision concerning the appeal of the Ottumwa Railway & Light Company from the decision of the Circuit Court compelling the company to resume the collection of a 5-cent fare.

#### DATES BACK TO 1918 STRIKE

In October, 1918, the trainmen of this company appealed to the War Labor Board for an increase in wages. The company joined with the men in the appeal, stipulating that any award of the board should be conditional upon the financial ability of the company to pay the increase decided upon. About the middle of December the War Labor Board handed down a decision increasing the wages of the trainmen about 30 per cent, and stipulating, as the company had requested, that this increase should be conditional upon the financial ability of the company to pay the increased wages. The company was not at that time in a position to pay the increase until an increase in fare was granted.

About one week before Christmas the trainmen notified the company that a strike would be called on Dec. 22 unless an increase in wages in accordance with the findings of the War Labor Board was granted prior to that date. The company appealed to the city commission in a request for a 6-cent fare, but the appeal was refused. The company then stated its case to the Business Men's Association, after which the business men appealed to the City Commission. This request also was refused by the city commission.

#### STRIKE AS A WEAPON

The trainmen went on strike on the Saturday before Christmas at 9 a.m. At the same time the power-house employees notified the company that they would strike within the next three days. The prospects of an entire shutdown of the railway system caused the City Commission to reconsider the case, and on the following Monday a resolution granting the 6-cent fare was passed by two of the commission against the non-concurrence of the Mayor in the decision. This resolution provided that the 6-cent fare should remain in effect until the peace treaty was ratified.

#### CASE BEFORE SUPREME COURT

The city election last April resulted in the overwhelming defeat of the three commissioners, and the last act which they performed was to rescind the 6-cent fare resolution. The company then appealed to the Circuit Court, but was refused the petition, and a 5-cent fare was resumed. Appeal was then taken to the Supreme Court of Iowa. Hearings on the appeal began on May 12 at Des Moines.

# Buffalo Interurban Fares Can Be Raised

## Supreme Court Justice Holds That General Public Policy Makes Restrictions of Quinby Case Inapplicable to Interurban Rates

A decision, important not only because it gives promise of partial rate relief for the International Railway, Buffalo, N. Y., but also because it helps to clarify the general rate-making situation in New York State, was handed down last week by the Albany special term of the New York Supreme Court.

The case arose through efforts of the cities of Tonawanda and North Tonawanda and the village of La Salle to secure writs prohibiting the Public Service Commission for the Second District of New York from investigating the reasonableness of certain interurban rates, the new tariff filed on Jan. 9, 1919, having been suspended pending the investigation. The municipalities contended that the company was bound by the interurban rates fixed in connection with the consents granted for the construction of its lines between Buffalo and Niagara Falls.

### PRIOR CASES INVOLVED

In order to understand the situation clearly it is necessary to recall that in the Quinby case in Rochester (223 N. Y. 244) the New York Court of Appeals, the highest court in the State, ruled early in 1918 that for various reasons the New York Legislature could not be deemed to have unmistakably granted to the commissions whatever power it possessed over rates stipulated in local electric railway franchises. In January, 1919, however, the Court of Appeals ruled in the South Glens Falls case (225 N. Y. 216) that under the regulatory law the commissions have power to increase gas rates over those stipulated in grants of location. In the present International Railway case the cities relied in great measure upon the Quinby case and the company upon the Glens Falls case. The present decision by Justice Hinman, therefore, serves to point out the interrelationship of the International Railway and the two former cases.

### GLENS FALLS NOT REVERSAL OF QUINBY CASE

In denying that the Glens Falls decision constituted a reversal of the earlier Quinby decision, Justice Hinman referred to the way the Glens Falls decision had pointed out the distinguishing elements of the Quinby case, and he added:

> In the latter (Quinby) case, the railroad company had to obtain the consent of the municipal authorities (Constitution, Art. 3, 18); a maximum rate of fare within the city of Rochester was imposed by the consent; this agreement was confirmed by a later contract; the contract was expressly recognized by the Legislature in Section 173 of the railroad law (L. 1910, Chap. 481); in Section 181 of the same law a provision was inserted which prohibits a railroad operating in any incorporated city or village from charging more than a 5-cent fare for a continuous ride within such city or village; and in 1915 the Legislature amended the charter of the city of Rochester and added a new section which provides that all street surface railroads operating therein should not charge more than 5 cents.
>
> All of these things influenced the judgment of the court in the Quinby case, as interpreted in the Glens Falls case, in reaching the conclusion that the general language of the public service commissions law, Section 49, was not adequate to overcome the fair inference, at least, conveyed from the special provisions of law in the charter and other acts, that such power had not been included in the jurisdiction of the commission.
>
> Thus the court has not said in unequivocal terms that the language of Section 49 cannot be interpreted in a proper case to confer jurisdiction in the Public Service Commission to deal with rates of fare established by agreement with local authorities. The decision in the Glens Falls case indicates, rather, that the rule in the Quinby case is not to be extended, but is to be applied only to those cases which rest upon similar facts in all respects.

### INTERNATIONAL CASE STILL DIFFERENT

As for the present case involving commission regulation of interurban rates of the International Railway, Justice Hinman considered that there was no similarity between the Quinby case and this. The municipal charters and State law did not confer upon Tonawanda, North Tonawanda or La Salle the power to fix fares within or without their limits; there was no legislative recognition of the consents or fares involved in such consents, and there was no statute fixing interurban rates of fare.

There remained only the effect of the constitutional provision regarding consents. In regard to this Justice Hinman pointed out that the high-speed line between Buffalo and Niagara Falls had been constructed upon private right-of-way, that the rates of fare involved in the case were interurban only and that the property did not come within the scope of the term "street railroad" as used in the constitutional provision relative to consents. Continuing he said:

> The constitutional provision was intended to confer upon the localities power to impose conditions, if at all, pertinent to the grant of such consents so far as the municipality had a city purpose to protect not inconsistent with the public interests of the State at large. The fixing of interurban rates of fare is normally a legislative function to be exercised in the interest of the general public, beyond the control of any city in the absence of clear warrant of authority therefor. It certainly was not intended to permit a city to invade the sovereignty of the State, where, as in the fixing of interurban rates, the rights of other municipalities and the inhabitants of the State generally are involved, and where thus a State issue rather than a local concern is clearly indicated. This compels the interpretation that the constitutional provision was not intended to cover such a contingency as arises in this case, and that the Legislature has never meant to leave any such unusual power in any municipality under the sanction of the constitutional provision but has reserved full authority in itself for that purpose and has given such power to its own agent, the Public Service Commission.
>
> Surely the Court of Appeals in the Quinby case referred to agreements coming within the purview of the constitutional provision and not to agreements which could not be sustained as coming within its fair and reasonable intendment and as to which, on grounds of general public policy of the State, the police power of the State must have been reserved in the absence of clear constitutional or statutory provision to the contrary. Just as it was intended by the constitutional provision to protect the city in matters of local concern, so, in the absence of clear warrant to the contrary, the Constitution should be interpreted to protect the State and its inhabitants in all matters of State concern.

Justice Hinman, therefore, was convinced "that the constitutional provision in question was not intended to protect those cities in the making of such agreements as to those interurban fares, that the agreements in question are not dignified by any constitutional local power, as in the Quinby case, and that, as in the Glens Falls gas case, the Public Service Commission has been given jurisdiction to investigate and fix reasonable rates." He therefore denied writs of prohibition against the commission.

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# Akron Fare Measure Defeated

The Morse-Witwer ordinance providing for a 6-cent fare on the railway lines of the Northern Ohio Traction & Light Company was repealed on May 20 in the referendum at Akron, Ohio. The vote was 10,563 to 2394. Only four precincts out of 114 were in favor of the ordinance. The proposal had the support of only one of three newspapers. One paper opposed the measure and one was non-committal.

The ordinance, revocable after one year, was intended as a temporary measure only to give an opportunity for further study with full examination of the affairs of the Northern Ohio Traction & Light Company looking toward the ultimate framing of a new franchise ordinance.

The winning arguments seemed to be that the light and power departments of the company were highly profitable, that the company had $2,000,000 surplus available for electric railway improvements; that it had increased dividends last year on the common stock from 5 per cent to 7 per cent, and that the present franchise provided sufficient power to compel extensions and the giving of adequate service.

### HOW THE FORCES DIVIDED

The results of the referendum indicate a sharp division along lines not apparent during the campaign. The Car Riders' League, led by Mayor Laub, polled votes in the great Goodrich, Goodyear, Miller, Firestone, Kelly-Springfield and other rubber plants which overwhelmed the Citizens' Progressive Association, which was organized by leading manufacturers, bankers and business men to foster the ordinance as a necessary part of the plans for civic improvement.

It was the first referendum in Akron. The city administration, which is Democratic, favored the ordinance, whereas Mr. Laub was the leader of a faction of Republicans, which now may become formidable. During the week ended May 17, the Citizens' Progressive Association which, as explained previously, represented men in every industry and walk of life, conducted an extensive publicity campaign in favor of the ordinance. In this campaign the railway company took no part.

## Interline Express Rates Wanted

Representatives of the ten interurban electric railways in Indiana have appeared before the Public Service Commission of Indiana and requested permission to establish in that State a general system of line and interline express freight rates.

Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, presented the opening and general statement of the interurban railways and explained that what the electric lines in Indiana wish is authority to establish a system of express business somewhat similar to that formerly operated by old line express companies having contracts with interurban lines and later abandoned by the federalized express companies in so far as shipping over electric lines is concerned.

The plan does not contemplate unified operation by the companies as a whole, but merely the co-operation of each line. The proposed rates, according to Mr. Henry, would be somewhat higher than the present rates which the companies charge, but lower than the federalized rates on steam lines.

The only protest against the proposal was made by the City Council of Shelbyville, Ind., which objects to any increase of rates over those now in effect for the company service of the kind now available to Shelbyville.

The proposed rates are as follows: Rates on all local traffic; that is, single line traffic 150 per cent of the first-class freight rate. Rates for interline traffic; that is, for two or more lines, 120 per cent of the first-class freight rate for the same distance on a local haul.

The companies request a minimum of 40 cents on local business and 50 cents on interline business. The companies also ask to establish certain line and interline commodity rates on such articles as empty ice cream containers, empty bread baskets and the like.

The co-operating lines are the Indianapolis & Cincinnati Traction Company; Union Traction Company of Indiana; Terre Haute, Indianapolis & Eastern; Interstate Public Service Company; Indiana Railways & Light Company; Fort Wayne & Northern Indiana Traction Company; Fort Wayne & Decatur Traction Company; Fort Wayne & Northwestern Traction Company; Winona Interurban Railway and the Marion & Bluffton Traction Company.

## Smoking Again an Issue in Chicago

During the epidemic of influenza smoking on both the elevated and surface cars in the city of Chicago was prohibited by the health commissioner. Prior to that time smoking had been permitted on the front platform of all surface cars, and a special smoker was carried on all elevated trains. After the order was issued, the elevated smokers were converted into regular passenger cars by taking down the match scratchers, and painting out the word "smoker" on the cars. Both the elevated and surface cars immediately became notably cleaner.

One of the Aldermen in the City Council has now initiated a measure to have the anti-smoking order set aside. This has met immediate opposition from the city health commissioner, who has announced that he would muster up supporters to aid him in his fight against the new order.

The opposition to the anti-smoking order contends that the order was issued at the height of the influenza epidemic and that the necessity for it has now passed. They maintain that such an order "is only a step toward taking away more personal liberty, and no one can see how far a thing like this will go."

The newspapers editorially favor a continuance of the anti-smoking order.

## Yonkers Case Argued

Thomas J. O'Neill, counsel for Henry Koster, a Yonkers taxpayer, who is suing in the Supreme Court for an injunction to compel the Yonkers Railroad to restore a 5-cent fare, contended that the company is perpetrating a fraud upon the city, in a brief filed with Justice Joseph Morschauser at Poughkeepsie on May 17.

Besides asking the restoration of the 5-cent fare, instead of a dime and 15 cents, Mr. O'Neill in his memorandum asks the court to force Corporation Counsel William A Walsh to sue the railroad "for the liquidated damages due the city because of the railroad's violation of its franchise." The company is under bond to live up to the 5-cent fare agreement in the ordinance of 1911 granting its franchise, which, plaintiff alleges, it illegally modified with only six instead of eight votes.

The whole legal fight over the carfare hinges on the construction of Section 37 of the second-class cities law. Under this section the company had to get eight votes to get its franchise in 1911, but could muster only six votes recently to amend the franchise to clear the way for a higher fare.

The company sets up the claim that its new contract is valid under Section 30. This, O'Neill claims, covers only legislative and governmental functions, which require but six votes of ten in the Board of Aldermen for enactment, but that all the laws on franchises are contained in Section 37.

In answer to the company's contention that it holds no franchises outside the city of Yonkers, and therefore can collect another fare beyond the city limits, Mr. O'Neill states that Yonkers would not have granted the company a franchise unless it agreed to carry passengers on its cars outside the city. The brief continues:

> It must be remembered that, indeed, this special ordinance passed by a vote of 6 to 4 on April 4, 1919, does this same thing. It authorizes a 5-cent fare from 242d Street subway terminal to McLean Avenue, one-half mile within Yonkers city limits.

The special ordinance referred to is the one increasing fares which is now under legal attack.

## Jersey Railway Finishes Its Case

The hearing before the Board of Public Utility Commissioners of New Jersey in regard to the proposed establishment of a zone system on the lines of the Public Service Railway was resumed before the commission on May 7. Robert M. Feustel, of Sloan, Huddle, Feustel & Freeman, testifying for the commission, declared it was his opinion that the development cost of $16,000,000 cited by the railway for the period from 1903 to 1918 was too liberal. On May 8 both R. E. Danforth, general manager of the railway, and Mr. Feustel testified. Mr. Danforth was questioned more particularly about increased costs. On May 9 the railway completed the presentation of its case dealing with the valuation. Prof. Henry C. Anderson was re-examined with respect to appraisal figures.

On May 12 testimony had to do largely with the proposed methods of recording and collecting fares under the zone system. Types of various machines to be installed on the cars were exhibited and their work illustrated. On May 16 Dr. Thomas Conway, Jr., witness for the railway, testified that the conditions under which the company operated in New Jersey were more peculiar than those faced by any other company in the United States due to the diversity of the system, the extensive mileage, the fact that the northern part of the territory is served by a number of steam railroads, the wide diffusion of factories and the proximity of the northern section to New York City and of the southern section to Philadelphia. Dr. Conway explained that more than eight months were devoted to making the check on which the zone system was based and in working out the plan, but that if the requirements of Mr. Sommer, counsel for the municipalities opposed to the zone plan, had been put through it would have taken the same number of years to complete the work.

## Not Even Mr. Storrs Knows

When asked recently for some sort of a statement as to what the Connecticut Company, New Haven, Conn., contemplated doing, now that practically all of the bills which were intended to relieve the company during its present financial difficulties had failed of passage in the Legislature, L. S. Storrs, the president of the company, said that he did not consider the time ripe for the company to make any statement as there had been no decision reached as to the future policy of the company, and that he "considered that the public was just about sick of reading indefinite, and many times incorrect, statements with regard to proposed action by the company."

He also stated that there is no chance whatever of the company operating jitneys or motor passenger vehicles over routes of abandoned lines, if such service is discontinued, for he said, "the jitneymen cannot make it pay and the company cannot do so."

# Transportation News Notes

**Eight-Cent Zones on Maine Interurban.**—The Atlantic Shore Railway, Sanford, Me., will advance its fare from 7 cents to 8 cents beginning June 1. This new fare will be collected in every zone except that between Sanford and Springvale. Under the new fare arrangement, tickets in strips of seven will be sold for 50 cents, and the price of school children's tickets in books of fifty coupons will be increased from $2 to $2.50.

**Court Upholds Fare Increase.**—The Supreme Court of Louisiana on May 5 affirmed the validity of the ordinance permitting the New Orleans Railway & Light Company to increase fares and gas rates. A petition to enjoin the collection of 6-cent fares was denied. The case of the Board of Public Utilities of Louisiana, in which the board claimed jurisdiction over rate fixing in New Orleans was also dismissed, the Court holding that the act of the General Assembly of 1916, purporting to create the Board of Public Utilities, was unconstitutional.

**Hearing on Rainier Valley Fares.**—The State Public Service Commission of Washington has started a hearing in Seattle on the proposed increased fares on the Seattle & Rainier Valley lines. The rate proposed amounts to an increase of 2 cents, making virtually a 7-cent fare when transfers are issued. The company proposes a straight 6-cent fare, with an additional cent for transfers, and a charge of 2 cents for every transfer accepted from other lines. The company contends that for five years previous to 1918 its net returns averaged only 0.87 of 1 per cent.

**Fare Compromise Likely.**—It is believed that a compromise will be reached by the City Council of Martins Ferry and the Wheeling Traction Company in the controversy as to passenger fares to be charged in that community. At a recent meeting of the City Council with C. P. Billings, superintendent of the company, the Council indicated its willingness to agree to rates on the following basis: 7-cent fare from Martins Ferry to Fourteenth Street, Wheeling; 7-cent fare from Martins Ferry to Pinch Run, Bellaire; 7-cent fare from Martins Ferry to Brookside and sixteen tickets for $1.

**Progress on Washington Case.**—The hearing before the Public Service Commission of the District of Columbia on the application of the Washington Railway & Electric Company for an increase in fare was continued during the week ended May 17. The principal witness was William F. Ham, president of the company. It was regarded as quite certain on May 15 that the commission would act in the near future on the company's application for relief. In the event the public did not require much time for presenting its case, the finding of the commission was regarded as likely to be handed down before June 1.

**Rates Must Be Fair.**—Fair play seems at last to be in sight for the utilities at Lansing, Mich. The conciliatory attitude on the part of the city representatives, however, was brought about in part in a peculiar way. Lansing stood to lose heavily industrially. The Olds Motor Works saw possibilities in locating at Lansing. But it demanded first of all that Lansing play fair with the company's own employees by pledging itself to secure for them adequate electric light, gas and railway facilities. As a result Lansing's new Council has adopted the report of a committee of citizens appointed to work out a solution of the utility problem and the city stands committed to a policy of rates based on findings following an inquiry into public utility production and operating costs.

**New Time-Table Folder at Reading.**—The Reading Transit & Light Company, Reading, Pa., is distributing a neat vest-pocket time-table in folder form, containing schedules of cars on all of the suburban lines of the company, a map showing their connections with other railway lines reaching surrounding cities and a chart giving the route numbers of cars, which enables patrons to become familiar with the cars they most frequently use. The time-table is revised and published annually on May 1. That it is recognized as one of the fixed and most useful institutions of the company is evidenced from the large number of requests for it that are received even before any notice of the new time-table is published. Very effective distribution is obtained by placing copies with all leading hotels, municipal and county offices, department stores and other business places.

**Newark Mayor Loses Fare Protest.**—Judge Johnson of the Second District Court at Newark, N. J., has decided that the Public Service Railway has the right to charge a 7-cent fare and that a conductor, representing the company, was justified in demanding that rate from Mayor Gillen, when the latter, on May 5, laid the ground for a test case. Judge Johnson cites the Supreme Court decision in the case of O'Brien vs. the Public Utilities Commission, the opinion having been written by Justice Swayze, in support of his belief that the company is empowered by the public utility act to fix rates so long as they are not questioned as to their justice and reasonableness by the Public Utilities Commission or through the filing of a written complaint against them. City Attorney Kearns has declared that he will prepare papers for an appeal of the case to the Supreme Court.

**Seven-Cent Rate Wanted.** — The Monongahela Valley Traction Company, Fairmont, W. Va., has applied to the Public Service Commission for a passenger rate increase from 5 cents in the cities it serves and 6 cents in rural communities to a flat rate of 7 cents in each zone. This would mean a 7-cent rate for city cars and a 7-cent rate for suburban cars. Some time ago the company applied for a 6-cent rate on the interurban between Parkersburg and Marietta and for six zones instead of five as at the present time. The application as filed affects all the lines operated by the Monongahela Valley Traction Company, including those in Parkersburg, Clarksburg, Fairmont, Weston and other points. The commission has fixed May 27 as the date for the hearing on the company's application. A separate application has been filed by the railway asking for a 20 per cent increase in power rates.

**Receiver's Fare Plea Granted.**—The Public Service Commission for the Second District of New York at its regular session on May 8, vacated and set aside the part of its order of Feb. 4 directing George Bullock, receiver of the Buffalo & Lake Erie Traction Company, to resume the sale of strips of seven one-way tickets between South Park Avenue, Lackawanna, and the Lacakawanna steel plant for 25 cents. The original order contained the provision on the understanding that the sale of tickets was required by a franchise. Receiver Bullock applied to the commission for relief on the ground that the provision for the sale of the tickets was not contained in any franchise but was a condition in a contract made on June 23, 1903, between the Lackawanna Steel Company and the Hamburg Railway and was to continue in force for three years. Commissioner Barhite, who investigated Mr. Bullock's application, found that the receiver's claim was true.

**Fare Rehearing Denied Chicago.**—The State Public Utilities Commission of Illinois on May 20 denied the application of the Chicago Surface Lines for a rehearing in the rate case. The original refusal of a 7-cent fare was announced a few weeks ago. The commission took the position then that the war emergency no longer existed and that business was picking up to such an extent on the surface lines that a reasonable return was assured to security holders. To give justification for this finding the commission reduced the valuation of the companies for rate making purposes about 28 per cent. The companies then asked for a rehearing for the purpose of proving up a valuation to the extent of its outstanding capital. This was not done in the original application because the commissioners did not intimate that valuation would be considered in the emergency petition. It is hinted that the next move will be the filing of a new petition asking for the fixing of higher rates based on a complete valuation of the properties.

# Personal Mention

## New Seattle Manager

### D. S. Barnes Transferred by Stone & Webster from Everett to Seattle—Other Organization Changes

Donald C. Barnes, Everett, Wash., manager of the traction and power properties of that city, has been appointed manager of the Seattle Division of the Puget Sound Traction, Light & Power Company, to succeed A. L. Kempster. He will remove from Everett to Seattle and will make his headquarters in the Electric Building at Seventh Avenue and Olive Street.

D. C. BARNES

Mr. Barnes is well known in utility circles. He has been associated with the management of Stone & Webster companies since 1905. During recent years he has been manager at Everett of the Puget Sound International Railway & Power Company and the Pacific Northwest Traction Company in charge of city railway, light and power operations and of the Seattle-Everett interurban lines.

He was born in Cambridge, Mass., in 1880 and was graduated from Harvard University in 1902 with the degree of A.B., and of B.S. in electrical engineering in 1904. Since his graduation he has served with the Boston (Mass.) Elevated Railway, the Little Rock Railway & Electric Company, Little Rock, Ark.; the Birmingham Railway, Light & Power Company, Birmingham, Ala.; the Electric Light & Power Company of Abington and Rockland, Mass.; the Brockton (Mass.) Edison Company; the Pawtucket (R. I.) Electric Company, and the Everett companies named previously.

Mr. Barnes is an associate member of the American Institute of Electrical Engineers and is a non-resident member of the University Club and of the Rainier Club of Seattle, he is chairman of the house committee of the Cascade Club of Everett, of the greens committee of the Everett Golf and Country Club and for the past two years has been chairman of the Civilian Relief Committee Everett Chapter of the Red Cross.

The executive offices of the company at Seattle announced other changes effective on May 12. Frank Dabney becomes assistant treasurer of the Renton Coal Company, the Diamond Ice Company and the Washington Auto Bus Company. John Harrisburger becomes general superintendent of power and Mr. Crawford superintendent of distribution.

The removal of Mr. Barnes from Everett makes changes in the offices there. George Newell has been appointed acting manager of that division and W. E. Delano has been appointed superintendent of railways.

Some members of the executive staff now in the Stuart Building, Seattle, will move over to the Electric Building on June 1 and take up the quarters vacated by the electric railway operating department when it goes into its new quarters at the County-City Building.

## Mr. Belden in New Field

### Head of New Hampshire Electric Railways Becomes Officer in Engineering Company

David A. Belden of Haverhill, Mass., will on June 1 become associated with the Harry M. Hope Engineering Company, Boston, Mass., in the capacity of vice-president.

For nearly fourteen years Mr. Belden has been president of New Hampshire Electric Railways and its subsidiary companies, operating railways and light and power plants in northeastern Massachusetts and southern New Hampshire, the principal offices of which are in Haverhill.

Mr. Belden was born in Aurora, Ill., about fifty years ago. He was educated at Racine College, Wis. From 1892 to 1901 he was general manager of various electric railways in northern Illinois, following which he became general manager of the Georgia Railway & Electric Company, Atlanta, Ga., where he remained until elected vice-president and general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala., which position he held until called to New England as president of the group of railway, light and power companies controlled by the New Hampshire Electric Railways.

He was president of the Massachusetts Street Railway Association in 1916-1917 and is now the Massachusetts vice-president of the New England Street Railway Club.

Mr. Belden is to continue as executive head and president of the companies with which he is now connected, but he will be less active in matters of operating detail, all of which work will be delegated to the local officials in Haverhill and Portsmouth. He expects to leave Haverhill in the fall and resume his residence in Boston, where he lived until September, 1917.

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**J. R. Wilson**, formerly traffic manager of the Sacramento Northern Railroad, Chico, Cal., is now actively connected with the Latourette-Fical Company, mechanical contractor, Sacramento, serving as vice-president and assistant manager.

**J. O. Penisten** on March 1 became superintendent of power distribution of the Union Traction Company of Indiana, Anderson, Ind., assuming the position made vacant by the resignation of G. H. Kelsay, who has become associated with the Cleveland, Southwestern & Columbus Railway. Mr. Penisten joined the Union Traction Company of Indiana in 1907, in the bonding department, and was later made foreman of this department. From this position he was promoted to substation operator, and in May, 1908, he joined the electric construction department in the work of repairing substation equipment and motors. Early in 1913 Mr. Penisten was made division electrician. He continued in that capacity until made superintendent of power distribution on March 1, last.

J. O. PENISTEN

**William S. Murray**, for many years chief electrical engineer of the New York, New Haven & Hartford Railroad and recently president of the Hoosatonic Power Company, which supplies power to part of the lines of the Connecticut Company, has opened an office as consulting engineer in New York. He will specialize on electrical generation and transmission, railroad electrification and conservation of natural resources. Mr. Murray's connection with the New York, New Haven & Hartford Railroad extended from April, 1905, to December, 1916, during which time the electrification of the railway with the single-phase system took place. For the first part of this time Mr. Murray was directly connected with the electrical engineering department and during the latter part of the time he acted as consulting engineer, as a member of the firm of McHenry & Murray, now dissolved.

**J. C. Johnson,** recently appointed general manager of the Iowa Southern Utilities Company with offices at Centerville, Ia., has been with David G. Fisher & Company, public utility engineers of Davenport, Ia., for the last two years. During the war with Germany, Mr. Johnson, as representative of the Fisher Company, had charge of the office of the Associated Manufacturers of Davenport at Washington, D. C. This office was the clearing house of Davenport manufacturers and the government on war contracts and was instrumental in having approximately $25,000,000 war contracts placed with concerns at Davenport. Mr. Johnson was graduated from Lewis Institute in 1909 and soon afterward accepted a position with the Commonwealth Edison Company, Chicago. He was engineer at the Fisk Street station in that city in 1912. Subsequently he went with the Westinghouse company, remaining there until 1917, when he accepted a position with the Fisher Company. At present Mr. Johnson is secretary-treasurer of the Fisher Company. When the Fisher interests bought out the D. C. Bradley and Frank S. Payne holdings in the Iowa Southern Utilities Company recently, Mr. Johnson was selected for the position of general manager to succeed Mr. Payne. His appointment was confirmed at the reorganization meeting of the new board of directors on May 15. He was also elected treasurer of the Iowa Southern Utilities Company, which furnishes thirty-two Iowa towns with electric power.

J. C. JOHNSON

**Dr. William McClellan,** who resigned recently as dean of the Wharton School of Finance and Commerce of the University of Pennsylvania, has been elected vice-president of the Cleveland (Ohio) Electric Illuminating Company. Dr. McClellan is a graduate of the University of Pennsylvania, and his technical experience includes that of engineer in charge of construction of the Philadelphia Rapid Transit Company, supervising engineer with Westinghouse, Church, Kerr & Company, a member of the firm of Campion & McClellan, and chief of the division of light, heat and power of the Public Service Commission for the Second District of New York.

**Raymond H. Smith** has resigned as vice-president and general manager of the Eastern Wisconsin Electric Company, with headquarters at Sheboygan, Wis., and as president of the Wisconsin Electrical Association and the Wisconsin Gas Association, to become connected with the Electric Bond & Share Company, New York. Mr. Smith entered the utility field in 1897 at Waterbury, Conn. He has been very successful, particularly in dealing with labor and in building up good public relations. A portrait and a biography of Mr. Smith were published in the ELECTRIC RAILWAY JOURNAL of April 5 at the time of his election as president of the Wisconsin Electrical Association.

**Frank B. Walker** has been appointed superintendent of way and structures of the Bay Street Railway, Boston, Mass., succeeding W. S. Hubbard. Mr. Walker was graduated from the University of Minnesota in 1897 in the civil engineering course. After post-graduat the Massachusetts Institute of Technology, he entered steam railroad service in the West. He was on the engineering staffs of the Minneapolis & St. Louis, Great Northern and Soo Line roads for various periods until 1914, when he went to Boston and entered the employ of the Bay State Street Railway. In the summer of 1918, Mr. Walker left the Bay State company and was employed by Fay, Spofford & Thorndike, consulting engineers, Boston, on the construction of the Boston Army Base. He recently returned to the Bay State engineering department to take up the duties relinquished by Mr. Hubbard, whose retirement from the electric railway field is noted in these columns.

**Cyrus S. Ching** has withdrawn from the electric railway industry and been placed in charge of industrial relations of the United States Rubber Company, with headquarters in New York. Mr. Ching is a native of Prince Edward Island. He came to the United States in 1899 and was employed as a surface car motorman on the Boston Elevated Railway, transferring to the rapid transit lines upon their opening in 1901. He soon became an inspector and after a term of service in the rolling stock department he organized a school of instruction for trainmen. Mr. Ching studied law in his spare time and was admitted to the Massachusetts bar in 1912. His work in the transportation department of the company brought him into close relations with M. C. Brush, at that time vice-president of the Boston system and later president. He became one of Mr. Brush's most valuable staff members and was assigned many important tasks in relation to the company's labor problems, and he became particularly useful in conferences between the management and the union organization. At the time of resigning to enter the industrial field he was in general charge of instruction work for trainmen.

**Frederick L. Ray** has been appointed superintendent of power plants of the Union Traction Company of Indiana, Anderson, Ind. Mr. Ray has spent the past thirty years in power station work, being last connected with the Merchants Heat & Light Company, Indianapolis, where he had charge of the power plants. For nine years previous to that he was superintendent of steam equipment of the Louisville (Ky.) Railway, during which time a new and modern power station was built. Other companies with which Mr. Ray has been associated are the Stanley Rule & Level Company, New Britain, Conn.; the Brooklyn, (N. Y.) Rapid Transit Company; Westinghouse, Church, Kerr & Company, New York City, and the Terre Haute (Ind.) Electric Railway. Mr. Ray has served as national president of the National Association of Stationary Engineers, an organization with members in every state in the Union.

F. L. RAY

**Major W. W. Nielsen,** Hartford, Conn., one of the commanders of the 349th Field Artillery, has been appointed assistant to E. C. Deal, general manager of the Springfield (Mo.) Traction Company and the Springfield Gas & Electric Company. Major Nielsen will assume the duties discharged by N. J. Cunningham, who resigned recently. The major is a graduate of Colgate University, Hamilton, Ohio. W. N. Colgate, whose ancestors founded Colgate University, is one of the directors of the Federal Light & Traction Company, which controls the companies at Springfield. Major Nielsen has been associated with the Federal company in the East.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Car Wheel Market Shows Little Activity

### Present Deliveries Are Good — Prices Remain Firm, but Tendency Is for Upward Revision

Regardless of the kind of wheel in use, whether it be the steel, steel tired or chilled iron, the market for car wheels for electric railways is rather quiet at the present time. Some producers are running up to capacity in order to fill back orders, but these are for the most part for steam railroad use. However, some traction lines are finding the wherewithal for purchases and orders are coming through.

There has been practically no price change lately. Due to the amount of labor involved and the very unstable condition of the labor market, there is a tendency toward an upward trend of prices rather than a downward trend. There is no assertion, however, that that condition will be brought about in the very near future.

Deliveries of steel products can be made in about thirty days whereas when the market comes back to normal the time will be nearer sixty to ninety days. The iron wheels can be turned out in a little better time.

In the meantime many railways, manufacturers say, are practicing every economy in regard to wheels, because they cannot afford to purchase new ones. Flats, if not of too large size, are allowed to remain in the tread, and the wheels are being ground or turned down to the limit before being scrapped. Where steel tires have worn down under heavy interurban service the wheels have been changed to cars doing lighter city service until the tires have been used to their limit.

Manufacturers are of the opinion that the present state of the market cannot last very long, and are hoping for some relief through Congressional action and the President's suggestion of federal investigation into electric railway conditions.

## Electric Railways Plan Extensions in Argentina

The Buenos Aires Western has electrified a portion of its suburban system. In its recently completed freight tunnel, the original plan was to use only electric locomotives, and an order had been placed with a German firm to supply these, but this order was canceled and at present steam locomotives are being used. The company has also built a tunnel which affords direct connection between its own passenger terminal and a station of the Anglo subway and has plans for the construction of several branches and feeders.

The Great Southern, which serves suburban Buenos Aires, has not electrified any portion of its line yet, but had made plans to do so prior to the war. It has a large passenger terminal in Buenos Aires, and the largest freight station in South America. An extension is projected from Zepala, where connection will be afforded with a line to be built by the Chilean State railways, thus forming a transcontinental line with easy grades.

## Few Orders Being Placed for Special Track Work

### Repair and Transfer from One Part of Line to Another Keeps Track in Condition

The market for track specialties is probably no better than that for almost any kind of electric railway material. To be sure there are some bright spots where traction companies have had to purchase new crossings, frogs, switches, etc., to replace parts in such condition as to render their use entirely out of the question. But this is a last resort in the market of to-day.

### RAILWAYS SHORT OF STOCKS

From available information the common practice seems to be to transfer from one part of the line to another the worn track parts. A part gone bad on a heavy duty section of track is pulled out and inserted in a section where traffic is light, and the piece in this section may be in such shape that it can be used for heavy duty work. Only in the last analysis is it scrapped and a new one ordered. The stocks kept by the railways are practically used up, and in the case of a bad break it is quite probable that some railways would have to wait for regular deliveries on their special part.

There is considerable repair work being done on the tracks. Building up of worn and broken parts is tiding over many faults until such time as the railways can see their way out of the financial difficulties besetting the paths of almost every one of them. It does not seem to be a question of the cost of the material but of the source from which to secure the investment. It is only too common to find traction companies with layouts already completed for many special pieces of track work. One case recently brought to notice is for 150 layouts planned by one line, to be turned into orders as soon as money for the work can be found.

## Transformer Raw Materials Costs Double Those of 1914

### Review of Increases with Respect to Selling Price Indicates There Will Be No Further Price Recessions

The approximate percentages of increase in the prices of materials entering into the manufacture of transformers in 1919 over the prices of the same materials for 1914 are set forth in the following table:

| Material | Approximate Percentage of Increase |
|---|---|
| Sheet iron laminations | 100 |
| Copper wire | 150 |
| Copper sheets | 100 |
| Cases and covers | 125 |
| Cotton tape | 300 |
| Insulating compounds | 60 |
| Hardware (iron) | 160 |
| Hardware (copper) | 120 |
| Hardware (brass) | 200 |
| Hardware (porcelain) | 60 |
| Lumber for crating | 80 |

It is apparent from this table that the cost of the principal raw materials involved in the manufacture of transformers will average over 100 per cent above the cost of the same materials in 1914. The effective increase in the price of transformers which has taken place during that time amounts to something like 40 per cent. It appears, therefore, that the ability to market transformers at an increase of only 40 per cent as against 100 per cent increase in the cost of material must have been due to some striking increase in efficiency. In most cases it was due to the application of principles of greater efficiency in the factory and to the application of methods involving a lower percentage of overhead in handling the business.

However, it is reasonable to expect that some of the materials listed in the table will go down to some extent in the future, but in the majority of cases the labor is not being reduced in price; moreover, the load factor on transformer orders has fallen off considerably. In view of all these circumstances and after having discussed the matter with some manufacturers of transformers, it does not appear probable that there can be a much further reduction of prices dnring 1919.

## Production of Rails for Electric Roads Shows Decline

In the last six years the production of steel girder and high T-rails for electric and street railways has constantly declined from year to year as shown in the attached table:

| | |
|---|---|
| 1918 | 20,834 Tons |
| 1917 | 91,674 Tons |
| 1916 | 127,410 Tons |
| 1915 | 133,965 Tons |
| 1914 | 136,889 Tons |
| 1913 | 195,659 Tons |

## Window Curtain Market Shows Improvement

### eavers Are Running on Short Time —The Prevailing Tendency of Prices Is Upward

Although there is a fair market for
ndow curtains it is still far below
e demand normally found at this sea-
n of the year. The number of new
rs in process of construction or about
be ordered is well below the average,
t there is still a demand from this
arter. In fact, there is a better de-
and for curtains for new cars than
r repairs and replacements to exist-
g rolling stock. Probably many more
rtains which present a worn appear-
ce will keep out sun and rain for
e more season than would normally
permitted to remain in service.

The fabric manufacturers and weav-
s have plenty of raw materials but
e demand for the finished product is
ht. Those plants which have not
together shut down are running two
three days a week. However, de-
eries can be taken care of in a
tisfactory manner.

Since the first of the year there has
en a price reduction of 7 or 8 per
nt. With the present course of cotton
has been predicted that the future
ice tendencies will be upward rather
an downward. Withal, there has
en reported a curtain market which
on the increase.

## edar Pole Market Satisfactory in Mid-West and South

In the Middle West and South the
arket for cedar poles is holding up
ll. In the Chicago district one of
e larger holding companies has just
rchased sufficient poles for a 95-mile
e. The Indiana Traction Company
s recently bought fourteen carloads,
d other concerns are buying in simi-
r quantities. Some pole producers
ate that they have already done more
siness this year than they did dur-
g the entire year of 1918, excluding
e government business.

A satisfactory volume of trade is re-
rted from the South. Drop shipments
rect from Western stocks to consum-
s are prompt and prices are steady.

## Rolling Stock

**Selma (Ala.) Electric Railway**, for-
erly the Selma Traction Company,
pects to repaint and repair its old
rs and secure some new rolling stock.

**Gary & Interurban Railway, Gary,
d.**, has received ten modern full-sized
rs which have been placed on the
oadway runs. The cars represent a
st of $110,000.

**Boston (Mass.) Elevated Railway**, ac-
rding to the trustees' report, contem-
ates the purchase of $10,500,000
orth of cars within the next five
ars, provided the Cambridge subway
ll goes through. This bill would provide for the purchase of the subway by the State. The purchase of 600 surface cars would permit the retirement of 625 of the oldest type of box cars, it is said, in 1919, and the remainder in the next year. Besides, it is planned to purchase thirty snow sweepers and a number of auto trucks.

## Track and Roadway

**Municipal Railway of San Francisco, San Francisco, Cal.**—The Board of Supervisors recently authorized the Board of Public Works to receive bids and enter into a contract for relocating the Union Street line of the Municipal Railway of San Francisco from Franklin and Union Streets to Van Ness Avenue and installing trolley poles and wires on Union Street from Franklin Street to Van Ness Avenue at an estimated cost of $22,000.

**Charles City Western Railway, Charles City, Iowa.**—A stock company, capitalized at $300,000, has been formed to construct an extension of the Charles City Western Railway from Colwell to New Haven, a distance of 10 miles. Articles of incorporation are now being drawn up. Surveys and estimates of the cost of different routes will be made at once. E. R. Ernsberger, general manager.

**East St. Louis (Ill.) Railway.**—The construction of a line to operate between the east approach of the free bridge and the plant of the Monsanto Chemical Company, 2 miles south of East St. Louis, is being planned by the East St. Louis Railway.

**Southern Illinois & St. Louis Railway, Harrisburg, Ill.**—It is reported that work will soon be resumed on the proposed line of the Southern Illinois & St. Louis Railway to connect Harrisburg, Pittsburg, Marion, Johnston City, West Frankfort, Benton and Herrin, which was interrupted at the outbreak of the war. W. H. Schott, Chicago, president. [Jan. 27, '17.]

**Boston (Mass.) Elevated Railway.**—A budget system has been established by the Boston Elevated Railway, under which the company plans to expend $21,500,000 for improvements during the next five years. Among the improvements listed are the reconstruction of 23 miles of trackage every year, in addition to the ordinary repair work; the building of a modern car shop; the installation of new turbine, rotary and stokers at the Lincoln power station; completion of the Somerville substation; installation of two rotaries in the Charlestown station; the provision of necessary conduit and cable construction; additions to the signal system; strengthening of bridges, etc.

**New York Municipal Railway, Brooklyn, N. Y.**—An order authorizing the New York Municipal Railway Corporation to let a contract under bids recently received from the American Bridge Company and the McClintic-Marshall Company for the structural steel with which to build a connection between the Culver Line and the Coney Island terminal has been made by Public Service Commissioner Lewis Nixon of the First District of New York. The city's elevated line is completed and in operation to Avenue X, and beyond that point to Sheepshead Bay Road is under construction. It is expected that the portion just referred to will be completed about the end of 1919. The approval of the Commissioner to the letting of the contract for the 600-ft. section from Sheepshead Bay Road to Coney Island terminal is given with the proviso that the work shall be completed about Dec. 31, 1919, or practically simultaneously with the completion of the city work, so that the whole remaining uncompleted section from Avenue X to Coney Island can be placed in operation at one time.

**New York State Railways, Syracuse, N. Y.**—A report from the New York State Railways states that the company has completed the construction of 700 ft. of single track 7-in. T-rail on East Fayette Street and has under construction 3800 ft. of single track 7-in. T-rail on West Genesee Street.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—Work will be begun at once by the Trenton & Mercer County Traction Corporation on the construction of the Market Street extension from Bridge Street to the new Municipal Dock. Rankin Johnson, president of the company, recently asked the Public Utility Commission to rescind its order of last November providing for an expenditure of $3,300 for improvements to the property of the corporation and issue an order permitting the company to expend $55,000 for work contemplated to the trackage, etc., on its various lines. The matter was taken under consideration by the commission.

**Brantford (Ont.) Municipal Railway.**—Work will be begun at once by the city on the construction of an extension of the Brantford Municipal Railway to connect Terrace Hill and the northeastern industrial section of the city.

**Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.**—It is reported that the Niagara, St. Catharines & Toronto Railway plans the reconstruction of several miles of track within the city of St. Catharines, the erection of new overhead work on the line between St. Catharines and Thorold, the enlarging and transforming of the park at Port Dalhousie into a pleasure ground and the provision of a bathing house there.

**Allentown & Reading Traction Company, Allentown, Pa.**—An extension is being built by the Allentown & Reading Traction Company on Walnut Street.

**North Branch Transit Company, Bloomsburg, Pa.**—This company reports that it will reconstruct about 2 miles of track, using Dayton steel ties and a 75-lb. girder rail.

**Scranton (Pa.) Railway.**—The city of Scranton and the Scranton Railway plan to improve and repair the Lackawanna Avenue bridge at a cost of about $20,000.

**Canadian Pacific Railroad, Montreal, Que.**—It is understood that the Canadian Pacific Railroad will soon ask for bids for equipping the branch line from Three Rivers to Shawinigan Falls and Grand Mère for electrical operation. J. M. Fairburn, chief engineer.

**Montreal (Que.) Tramways.**—Work has been begun by the Montreal Tramways on the reconstruction of its track on the west side of St. Denis Street and the east side of St. Lawrence Street

## Power Houses, Shops and Buildings

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—Work will soon be begun by the Chicago, North Shore & Milwaukee Railroad on the construction of a station at Sixth Street between Sycamore and Clybourn Streets, Milwaukee, Wis.

**Interstate Public Service Company, Indianapolis, Ind.**—Plans have been completed by the Interstate Public Service Company for the construction of an interurban freight station at Brook, First, Walnut and Liberty Streets, to be completed by Aug. 1.

**St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.**—The St. Joseph Railway, Light, Heat & Power Company has purchased a tract of land running the entire length north and south of its power house and extending from the power house west to the Missouri River. The additional tract will provide for any extension of the plant in the future. The purchase also assures the completion of the company's extensive alterations in its power plant before Sept. 15.

**Northwestern Ohio Railway & Power Company, Toledo, Ohio.**—A report from the Northwestern Ohio Railway & Power Company states that it will place contracts at once for the construction of a carhouse and repair shops at Oak Harbor, Ohio.

**Philadelphia, Pa.** — Sealed proposals will be received by William S. Twining, director Department of City Transit, for the following work appurtenant to the Frankford Elevated Railway: Contract No. 564—Erection of brick, steel and reinforced concrete station buildings at the northeast and southwest corners of Kensington and Allegheny Avenues, including the removal of existing buildings on these sites. Contract No. 565—Erection of brick, steel and reinforced concrete station buildings at the southwest and southeast corners of Kensington Avenue and Somerset Street, including the removal of existing buildings from these sites. The plans are modifications of those issued for bids opened April 29 and rejected. Copies of plans and specifications may be obtained upon deposit of $10, to be refunded upon return of plans.

## Trade Notes

### Westinghouse Changes

The following changes in the executive sales personnel of the Westinghouse Electric & Manufacturing Company are announced:

E. A. Thornwell, manager of the railway and power division, Atlanta office, returned from government service, has resumed his former duties.

C. E. Smith, of the engineering department, who spent several years in the Pittsburgh office and later was connected with the Robbins & Myers Company of Pittsburgh, has resumed work with the export department of the Westinghouse company.

A. D. Stephanus, after eight years in the export department, East Pittsburgh, Pa., has been transferred to the Westinghouse Norsk Elektrisk Aktieselskap, Christiania, Norway.

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**Portable Electric Tool Association** held its annual meeting in Cincinnati on April 24-25. In the discussions that ensued it was brought out that American manufacturers of portable electric tools would have to coöperate more closely to obtain a fair share of foreign business. Many requests for agency representations were reported, as were visits of European machinery importers with a view to making selling arrangements. That the outlook is good was the consensus of opinion.

**Frank B. Cook Company, Chicago,** has obtained a license from A. F. Daum to manufacture refillable fuses under Daum patents. Negotiations are under way with other firms for a similar license.

**Standard Electric Tool Company of Cincinnati, Ohio,** is reported to have completed the removal of its machinery to the new plant at York Street and Western Avenue.

**Joseph Myerson,** dealer in steam, electrical and power transmission machinery, announces that he has moved to large and more centrally located quarters at 411-413 Atlantic Avenue and 74 Purchase Street, Boston.

**H. B. Bush,** of the Bush Electric Tool & Manufacturing Works, Redlands, Cal., writes that he is shipping his entire equipment to Cleveland, Ohio, where he is forming a new company to be known as the Bush Electric Manufacturing Company. A rapidly growing volume of sales made it necessary to have large factory space in the East. The company's temporary address is 6616 Morgan Avenue, Cleveland, Ohio.

**M. H. Jones,** who has been connected with the Westinghouse Electric & Manufacturing Company for the past fifteen years as assistant to manager of Philadelphia district, has resigned to become sales manager of the Standard Electric & Elevator Company of Baltimore.

**Black & Decker Manufacturing Company, Baltimore, Md.,** has just established a New York office in Room 2920, Equitable Building, which will be in charge of G. R. Lundane, who will supervise the distribution of Black & Decker products in New York City and surrounding territory, including the State of Connecticut.

**R. Sanford Riley,** president of the Sanford Riley Stoker Company, Worcester, Mass., and the Murphy Iron Works, has returned to his private interests after having completed the organization of a performance section of the Emergency Fleet Corporation. The performance section has charge of all trial trips and follows up the defects developed in service.

**Chicago Pneumatic Tool Company** announces the election of Allan E. Goodhue as managing director of its English subsidiary, the Consolidated Pneumatic Tool Company, Ltd., with offices at 170 Piccadilly, London. Mr. Goodhue will also be in charge of European sales for the Chicago Pneumatic Tool Company. Mr. Goodhue is to sail for England May 13.

**A firm in Spain** (No. 29,179) desires to purchase high-pressure turbines and electrical machinery of all sorts for developing a waterfall power in that country. Quotations should be given f.o.b. New York. Payment, cash against documents. Correspondence may be in English. Further information on request to Bureau of Foreign and Domestic Commerce, Washington, D. C., mentioning number.

**Lewis Jalovec** has been appointed assistant to the United States Foreign Trade Commissioner to Czecho-Slovakia. He will be stationed at Prague, Bohemia. Information in regard to markets and information of any kind concerning the country where he will be stationed will be gladly furnished upon application. It is interesting that Mr. Jalovec is an engineer—one of the first to be appointed to such a governmental position.

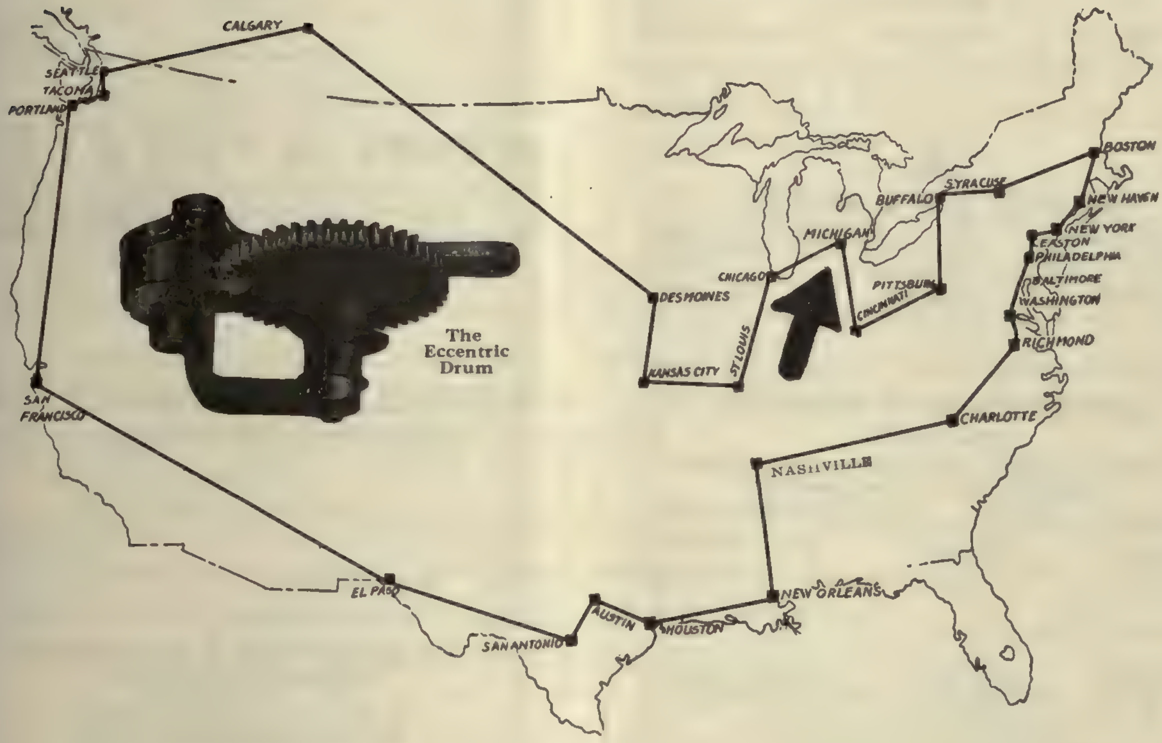
**Van Dorn Electric Tool Company, Cleveland, Ohio,** announces that the new Chicago office is at 527 South Dearborn Street. William Cottrell, sales manager at the Chicago branch, says that the phenomenal increase in business enjoyed by the company is the result of the insistent demand to-day for mechanical devices of proved efficiency and economy. He emphasized the imperative need of the increased accommodations.

## New Advertising Literature

**Central Scientific Company, 460 East Ohio Street, Chicago:** Bulletin No. 8 explaining the Van Sicklen-Elgin chronometric precision tachometer.

**Metal & Thermit Corporation, New York:** Folder entitled "How Thermit Healed My Broken Jaw." It describes the way in which a 13½-ton upper jaw of an alligator shear in the works of Joseph Joseph & Brothers Company at Modena, Pa., was mended.

# Peacock Brakes from Coast to Coast



## Michigan uses Peacocks for City-Suburban - Interurban Service

The example of the Michigan Railways again brings out a fact that we cannot repeat too often—namely—there is a *Peacock Brake for every service.*

On steep grades—in crowded streets—for speedy interurbans—for tiny little towns—Peacock Brakes can be secured in a type to develop the greatest safety and economy for that particular type of service.

Practically all DETROIT cars use Peacock Brakes—two-car trains that operate 24 hours a day, full-up most of the time. Such service puts a mighty strain on the equipment—but there's no service too hard for the Peacock.

If you will ask us we will be glad to suggest just the right kind, as there is no need to use too powerful a brake when a lighter, cheaper one will actually be more serviceable.

Michigan's cities are but a few of the hundreds of cities and towns using Peacocks.

*Next Stop*—CINCINNATI

## National Brake Co.

Buffalo, N. Y.

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**Ford, Bacon & Davis,**
Engineers.
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**STONE & WEBSTER**
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

**SANDERSON & PORTER**
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EVERY WEEK

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

**Scofield Engineering Co.** Consulting Engineers PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

# A STATEMENT AND GUARANTEE

*By* ALEXANDER F. JENKINS
*President of*

## THE ALEXANDER MILBURN COMPANY

*Manufacturers of* Oxy-Acetylene Welding and Cutting Apparatus

MILBURN Torches are original in design. They in no sense imitate those of any other manufacturer. On the contrary, because of their originality and invention, patents have been issued by the United States Patent Office (and others are pending), covering many original and distinguishing features.

> Interchangeable welding and cutting tips—
>
> Design which makes possible the use of comparatively low and equal pressures of oxygen and acetylene—
>
> Gas passages so arranged that a cleaning wire can be passed completely through any of them without injury—
>
> Outer walls protecting the seats of the tips from injury due to rough handling.
>
> Design making possible high efficiency, great economy of gases and the positive elimination of backfiring—
>
> These and other original features, developed by the founders of this Company during the last twenty years, distinguish the MILBURN Torches and are largely responsible for their acknowledged superiority.

The United States Patent Office has granted protection to features which give *Milburn* Torches their exceptional originality and worth. This Company guarantees against any liability for alleged infringements which may arise from sale or use of its Torches and will defend any such action at its own expense.

*Alexander F. Jenkins,*
*President.*

Baltimore, Maryland
May 15, 1919

*Reputable firms are invited to send to us, our Branches or our Agents, for* MILBURN *Torches to test and compare at our expense.*

# THE FAIRBANKS COMPANY O. K.

## *—what it means to Purchasing Agents*

"THE Fairbanks Company O. K." appears on many thousands of articles listed under the general headings:

(1) Mill, Mine and Railway Supplies
(2) Scales
(3) Engines and Pumps
(4) Valves
(5) Trucks and Wheelbarrows
(6) Power Transmission
(7) Machine Tools
(8) Automobile and Service Station Equipment

"The Fairbanks Company O. K." is put on these products because The Fairbanks Company stands squarely in back of all that it sells.

"The Fairbanks Company O. K." means O. K. in quality—O. K. in price—O. K. in after-service.

Purchasing Departments find that most of their needs are met in the lines sold by The Fairbanks Company. They send their full list of wants to the nearest Fairbanks Branch House or dealer. Instead of scattered dealings they thus make a clean-cut transaction.

Whether you are a big or a small buyer, *time is money*. Time spent in talking with a dozen salesmen, placing a dozen orders, checking a dozen shipments is cash subtracted from your bank balance. Make no mistake about that.

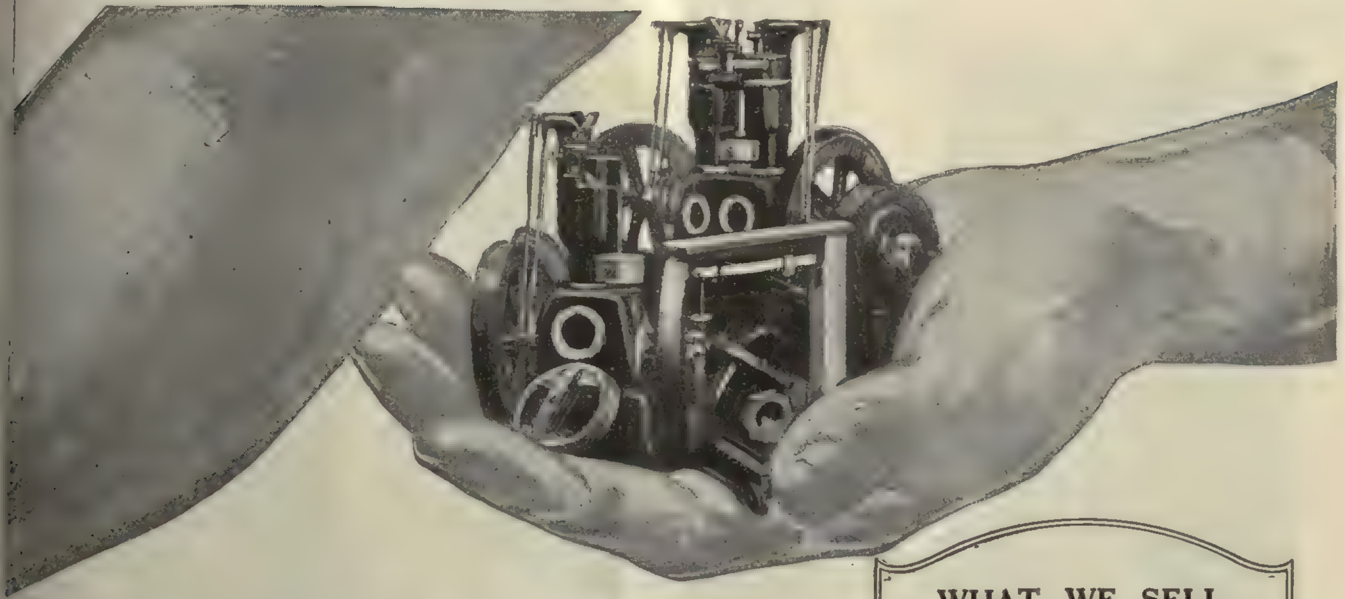
### VALVES

**All are brim-full of quality. Every one must pass the rigid tests required to secure "The Fairbanks Company O.K."**

**There is a valve in stock for every use and condition of service. And quick delivery permits that break downs in the steam, water or air line, be repaired without undue loss of time.**

**Get in touch with the nearest branch and become acquainted with our service. It will help your buying.**

**MILL SUPPLIES » SCALES » VALVES » MACHINE TOOLS » TRANSMISSION**



The Fairbanks Company stocks its Branch Houses to meet most of the mechanical-equipment needs of mills, factories, mines, railroads and steamship lines.

Whether wrench, valve, scale, saw, transmission, engine, pump or any of the other articles sold by The Fairbanks Company, you are assured high quality and a fair price when you see "The Fairbanks Company O. K."

We invite you to telephone or to call on the nearest Fairbanks Branch House.

THE FAIRBANKS COMPANY
ADMINISTRATIVE OFFICES: NEW YORK

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Baltimore
Boston
Birmingham
Bridgeport
Buffalo
Chicago
Detroit
Hartford
New York
Newark
New Orleans
Pittsburgh
Paterson
Philadelphia
Providence
Rochester
Scranton
St. Louis
Syracuse
Utica
Washington
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Paris, France

**WHAT WE SELL**
*—all carry*
"The Fairbanks Company O. K."

MILL, MINE and RAILWAY SUPPLIES

The lines are complete. Every item is the pick of its class.

TRUCKS and WHEELBARROWS

All types, sizes, for every use — all bear "The Fairbanks Company O. K."

MACHINE TOOLS

All leaders in their lines. Sold under "The Fairbanks Company O. K."

SCALES

The famous Fairbanks Scales—the scales that do the world's weighing.

VALVES

All types—all sizes—all bear "The Fairbanks Company O. K."

POWER TRANSMISSION

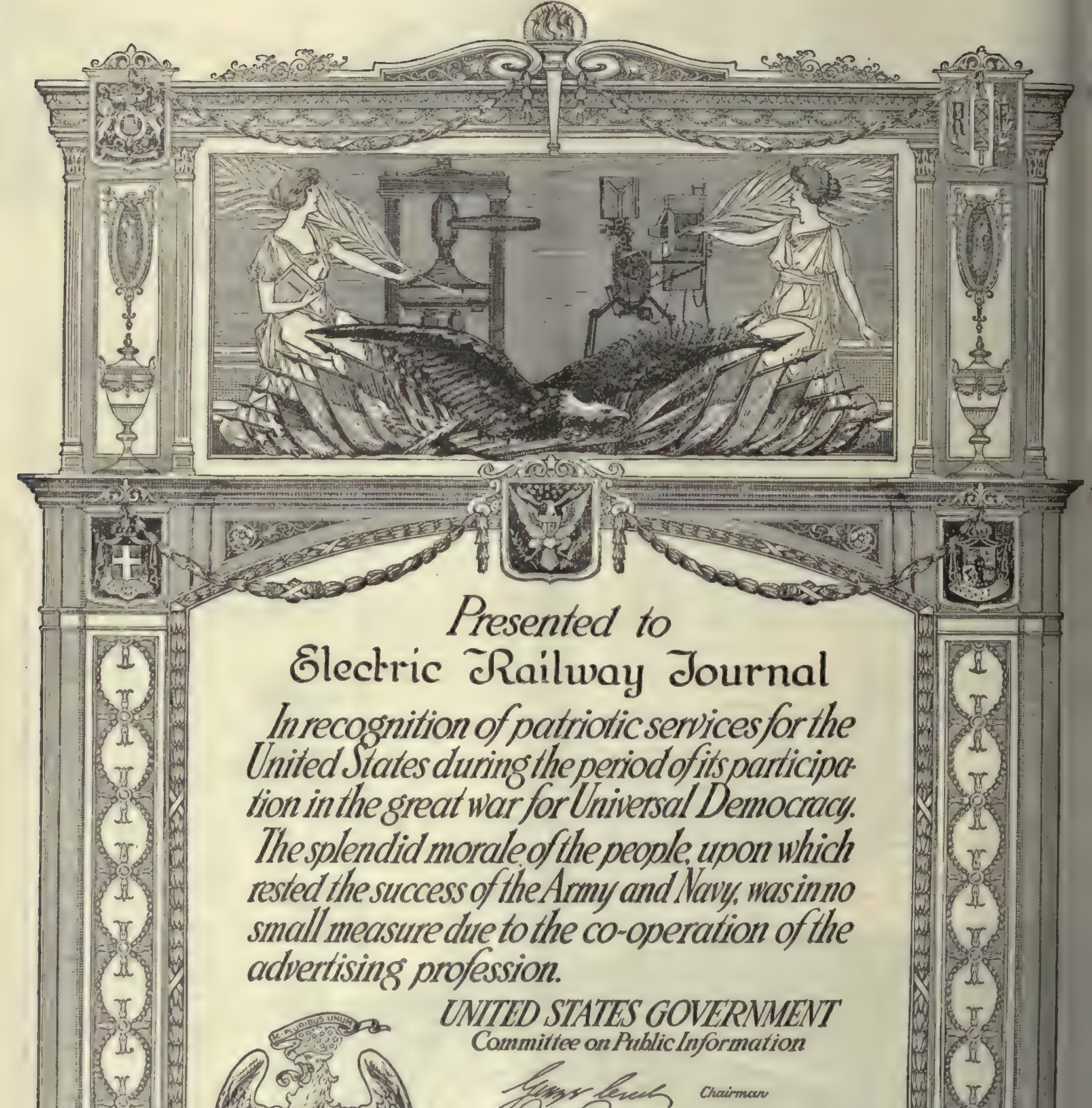
Everything you need in transmission appliances.

ENGINES and PUMPS

Engines—gasoline, kerosene and oil; and new type Super-Diesel.

*The*
FAIRBANKS
*Company*
O.K.

TRUCKS & WHEELBARROWS ~ ENGINES & PUMPS



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*In recognition of patriotic services for the United States during the period of its participation in the great war for Universal Democracy. The splendid morale of the people, upon which rested the success of the Army and Navy, was in no small measure due to the co-operation of the advertising profession.*

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PURCHASING RINDSFOSS
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ENGINEERING OF SHOPS AND FACTORIES TYRRELL
ENGINEERING OF POWER PLANTS FERNALD AND ORROK

# *You can fill this big-pay chair*

There are big-pay chairs throughout the country vacant for want of progressive young executives who know the details of modern factory management.

Today it is the *trained* factory manager who is wanted. Modern industry is so complex that only the *trained* man can lift himself above the crowd. Adequately trained men are hard to find.

Are you giving this opportunity proper consideration?

Do you know that you can learn what it pays to know about factory organization and administration through

# FACTORY MANAGEMENT

These six great books are the work of such well-known authorities as Dexter S. Kimball, Hugo Diemer, A. Hamilton Church, C. S. Rindsfoos, H. G. Tyrrell, R. H. Fernald and George A. Orrok. These men tell you what it pays to know about modern factory management.

Some of the biggest factory managers in the country have purchased these books. Why not back up *your* experience with this thorough training in factory management?

**Think how much it would be worth to you to know**

the principles of the economic location of factories (a subject of increasing importance nowadays) the scientific lay-out of factories, proper building designs and methods, departmental organizations, plans and systems that cut costs and increase efficiency, selecting and purchasing equipment, cost methods, managing help, employees' welfare features, and those features of power plant equipment and operation which the fully-equipped factory manager should know—these are some of the topics covered in FACTORY MANAGEMENT.

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**MANUFACTURING COSTS AND ACCOUNTS** by A. Hamilton Church.

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Never could see any logic
in debating car-operation problems
—when cars couldn't operate.
Can't expect a lightweight car to
operate whose only quality is lightness.

Experience since building the first
one-man car (years ago) taught
us the other two essentials:

→ Workmanship and Materials

Experienced car-users call us
the Quality Shops.
There's a Reason

St. Louis Car Co.,
St. Louis, Mo.

"STANDARD"

Steel Tires

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Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

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The Great and Particular Value of

**CYPRESS**

*"THE WOOD ETERNAL"*

is its high resistance to decay. (Specify "All-heart Tidewater Cypress"—every piece identified by the above trade-mark as the product of a responsible *Licensed* Assn. Mill.)

The Railway Signal Association has always placed all-heart Cypress among the first choices in the list of suitable woods for

***Trunking and Capping***

The Railway Signal Association makes its recommendations as a result of definite knowledge, and its membership includes many able men who are Cypress enthusiasts. We gladly refer any doubter as to Cypress superiority to any well posted engineer who has had experience with "The Wood Eternal."

The same service conditions which make Cypress superior for "Trunking and Capping" are present in many other railway lumber requirements, such as

***Fencing***

and similar purposes where the material is exposed constantly to the weather and high resistance to decay is essential.

If railway men in general will study the question of wood durability for other uses as carefully as Railway Signal men have studied it there will be a lot more all-heart Cypress used in railway service—to the very great economy of the companies using it.

Our data are at your service.

*WILL YOU WRITE US? WE WILL REPLY FRANKLY*

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***New Orleans, La.***
*or*
***1265 Heard National Bank Building***
***Jacksonville, Fla.***

*In War or Peace Times—*

**Cut Out the Waste!**

Clean up! Do it NOW! Do it regularly!

Every piece of Idle Equipment, Unnecessary Material or Scrap represents WASTE!

*—waste*

**Money!**
**Time!**
**Space!**
**Labor!**
**Material!**

—the *money* such equipment or material cost earns nothing and is not available for other use.

—the *time* it is idle is wasted when it can render service elsewhere.

—the *space* it occupies costs money and may be needed for other purposes.

—the *labor* of its manufacture is wasted and also the labor of producing a duplicate for the man who *can* use it.

—the *material* it represents would be useful in another form.

Cut out *all* this waste! Don't have material or equipment around that is not needed. Turn it into cash.

There is always a market for either scrap or good used machinery. Conservation of both materials and machinery can be practiced with just as much profit in peace as in war times.

Buyers for surplus material, good used machinery, junk or scrap, can easily be found through the

**Searchlight Section**

418

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## Arc Welding Rheostat

### Weighs only 140 pounds —goes to the work

Most welding rheostats are bulky and cumbersome. But not the Erico. It answers the demand for one that can readily be *taken to the work*, as it weighs only 140 pounds for a 600-volt line.

The current can be regulated to any value between 60 and 195 amperes by switches, and it will operate on any voltage between 350 and 750. An ideal rheostat for arc welding in the shop—and when fitted with flanged wheels, and used in connection with the Erico Portable Welder it makes a fast, economical rail-bonding outfit.

**Let us tell you more about it.**

**The Electric Railway Improvement Co.**
**Cleveland, Ohio**

### *True Your Commutators with*
## "HANDY" COMMUTATOR STONES

Cheaper, Quicker and far better than turning. This BLOOMER GIRL is stoning a Cleveland Railway 1500-k. w., 600-volt, 514 R. P. M., 60-Cycle, Rotary Converter running at full speed.

The comparative costs on three of these machines are:

**Labor and Material**

| Turning | | Stoning | |
|---|---|---|---|
| 3 men 25 hrs. @ 45c. per hr. | $33.75 | 2 men 4 hrs. @ 45c. per hr. | $3.60 |
| | | Cost of stone used | 3.00 |
| | $33.75 | | $6.60 |

Estimated value of copper removed.

| Turning | Stoning |
|---|---|
| $100.00 | $15.00 |

A saving of 21 hours' time out of service.

No. 6 CUTTING STONE for first cut on commutators with heavy glaze or bad flat spots.

No. 25 FINISHING STONE for final polishing or to remove small flat spots, small ridges, and high mica. We guarantee every stone.

*Send for prices and further descriptive matter.*

**THE HANDY SUPPLY & MFG. CO.**
**11737 Detroit Avenue, Cleveland Ohio**

**Steel for Service**

Carnegie Steel Company are the successors to the pioneers in production of

# Rolled Steel Gear Blanks

for use in cutting gears for street railway and industrial uses.

Discs are sheared from rolled cylindrical blooms, then forged by hydraulic pressure, and then revolved by steam power and subjected to rolling and forging actions simultaneously. This process imparts to the gear blanks a great uniform strength and toughness and unusual wearing qualities.

Severe industrial service amply proves that gears cut by gear cutters from Carnegie Rolled Steel Blanks wear three to seven times as long as cast steel gears. They are used in railway, motor and industrial work and, more recently, in high grade tractors. They range in size from 12.22 inches in diameter for the smallest to 36.6 inches in diameter for the largest.

This company is not only a pioneer or successor to pioneers in many lines of manufacture, but also now manufactures a larger variety of products than any other steel maker in the United States.

**The mark of quality** CARNEGIE **It protects the user**

## Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

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## ARE MADE RIGHT AND STAY RIGHT

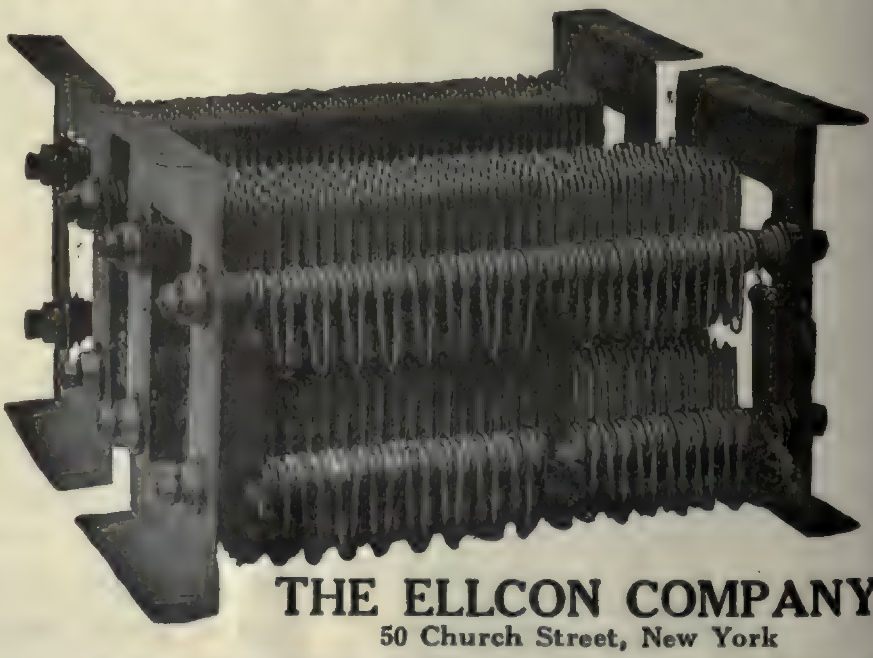
No resistors get more abuse than those under a car.

They are abused electrically by careless operation of the controller.

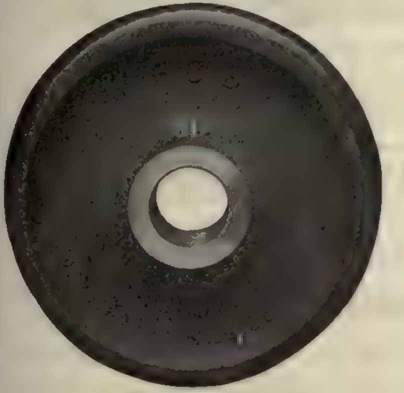
They are abused mechanically by exposure to dusty, muddy and stone-littered streets.

Until the arrival of E M B drawn, non-corroding grid resistors, troubles from these sources seemed unavoidable.

E M B grid resistors actually have made this part of your equipment troubleproof.



**THE ELLCON COMPANY**
50 Church Street, New York



The Cost of

GRIFFIN
F. C. S.
WHEELS

is of secondary consideration when taking into account their guarantee and scrap value.

Every detail of manufacture is given the most careful attention. They are scientifically designed so that each part is correctly adapted for its particular function.

The chilled tread surface contains three and one-half per cent. carbon white iron—is harder than tool steel, and capable of long wear.

Griffin service will assist you in selecting the proper size and weight for your cars.

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Peirce Forged Steel Pins with Sheet Steel Thimbles
Your best insurance against insulator breakage
Hubbard & Company
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*Eliminate Accidents*
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52 Vanderbilt Avenue, New York. Monadnock Block, Chicago.
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TUBULAR STEEL POLES
*Ask for "NATIONAL" Bulletin No. 14, "NATIONAL" Tubular Steel Poles*
NATIONAL TUBE COMPANY, PITTSBURGH, PA.

U. S. Electric Contact Signals for
Single-track block-signal protection
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Protection at intersections with wyes
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AETNA INSULATION LINE MATERIAL
Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
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Established 1877
Branches—New York, 135 B'way, Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 48 Milton Street

EUREKA PRODUCTS
Commutators, Trolley Wheels, Sleet Trolley Wheels, Trolley Ears, Line Material, Controller Fingers, Brush Holders, etc.
We make quality goods.
THE EUREKA COMPANY, North East, Pa.

Aluminum Company
of America

Manufacturers of

ALUMINUM

Electrical Conductors

All-Aluminum and Steel Reinforced

for

Transmission Lines
Railway and Industrial Feeders
Signal Circuits
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Bus Bars

also

Ingots—Rods—Rivets—Extruded Shapes
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WEATHERPROOF WIRE
LEAD ENCASED CABLES
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ALL KINDS OF INSULATED WIRE

1870 - EUGENE F. PHILLIPS. AMERICAN ELECTRICAL WORKS - 1882.

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AND CABLE
PAPER INSULATED
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(Single, Duplex and Three Phase)
TROLLEY WIRE
(Round, Grooved or Figure 8)
BARE COPPER WIRES
AND CABLES
MAGNET WIRE
(Cotton or Asbestos)

Americanite Rubber Covered Wire
Incandescent Lamp Cord

Galvanized Iron and Steel
Wire and Strand

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Phillipsdale, R. I.

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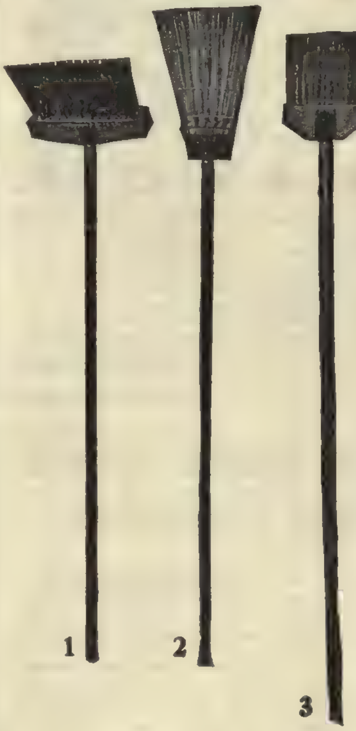

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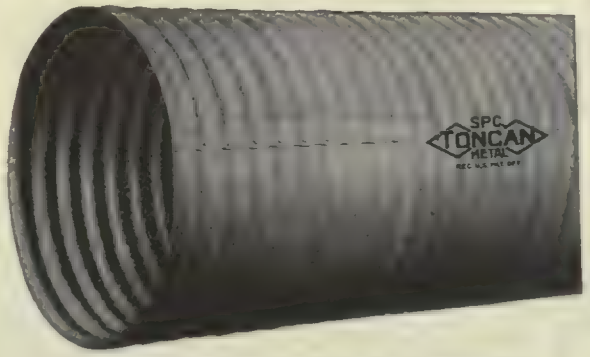

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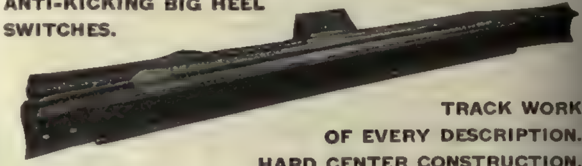

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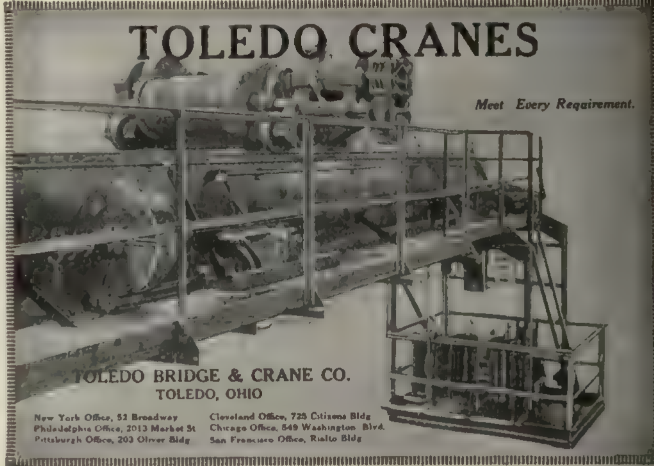

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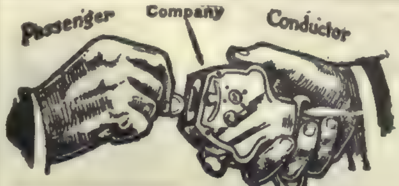

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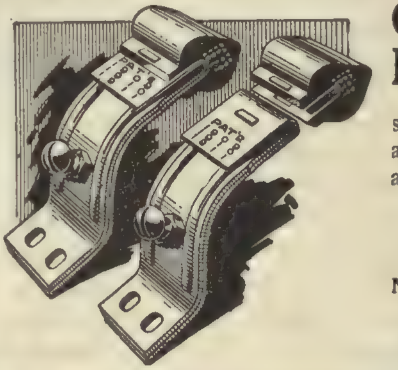

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### 60 CYCLE

10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

### 25 CYCLE

6500 Kw. Allis-Chalmers Horizontal Turbo Generator Unit, 3-phase, 25-cycle, 6600 volts, 4 pole, 750 RPM. Send for full details and specifications.

***We have these units in stock for immediate shipment. We own them and are not acting as brokers.***

**MACGOVERN & COMPANY, Inc.**
114 Liberty Street, New York, N. Y.
Pittsburgh Office, 498 Union Arcade Building

## ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.

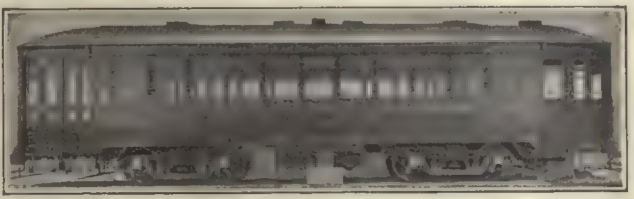
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.

1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
*Telephone* 4337-4338 *Rector*



## *IMMEDIATE DELIVERY*

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4GE Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO., 111 West Monroe Street, Chicago, Ill.**
*Cars and Trucks, Snow Sweepers, Electric Locomotives*

## Cars, Rails, Locomotives, Cranes, Generators, Turbines, Motors, Machine Tools, Hammers, Presses

Everything For
POWER, RAILROADS, INDUSTRY, CONTRACTORS

What do you want to Buy or Sell?
Write for our Bulletin No. 119.

***Our ENGINEERING DEPARTMENT will Design, Construct and Finance your undertakings. Send us particulars.***

**RAILWAY & POWER EQUIPMENT CO.**
Woolworth Bldg., New York, N. Y.
Cable Address: "Johnscar" Code, Western Union.

FOR SALE

# Complete Power Equipment

Consisting of Boilers, Generators, Rotary Converters, Transformers and Auxiliaries. All electrical apparatus is 25 cycle, in first-class condition, and can be released about July 1st. For further information apply to

**PHILA. & WESTERN RY. CO., Upper Darby Branch, Philadelphia, Pa.**

FOR SALE

## 80-LB. NEW SHANGHAI RAIL

### *At Attractive Price*

Specially adapted for brick or asphalt paving. Let us have your inquiries, for above, or any weight rail, new or relayers.

***Our Prices Are Right***

**THE WILKOFF COMPANY**
First National Bank Bldg., Pittsburgh, Pa.
*Office and Yards:* Youngstown, Ohio
*New York Office:* Woolworth Bldg.

## WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc **Remember our initials stand for our product.**

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

## *FOR IMMEDIATE SHIPMENT*

75 tons of 6-in., 62-lb. Shanghai Relaying Rail, practically as good as new, with angle bars to match. Wire for quotation.

Also all other sections of Standard Relaying Rail and a lot of Steel Girder and Deck Plate Bridges.

M. K. FRANK, Frick Bldg., Pittsburgh, Pa.

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Rectifiers**
Holden & White, Inc.

**Anchors, Guy**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers**
Railway Improvement Co.

**Ash Storage Tanks, Cast Iron**
Green Engineering Company

**Automobiles and Buses**
Brill Co., The J. G.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Batteries, Storage**
Electric Storage Battery Co.

**Bearings and Bearing Metals**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
Holden & White, Inc.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.
Lincoln Bonding Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Lincoln Bonding Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Bond Testers**
Lincoln Bonding Co.

**Book Publishers**
McGraw-Hill Book Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
Bates Expanded Steel Truss Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters**
Holden & White, Inc.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

**Brazing and Welding Processes**
Lincoln Bonding Co.

**Bricks, Fire**
Green Engineering Co.

**Brooms, Track, Steel or Rattan**
Paxson Co., J. W.
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite**
United States Graphite Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Buckets**
Blaw-Knox Company

**Bushings, Case Hardened & Manganese**
Bemis Car Truck Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Electric Service Supplies Co.
Holden & White, Inc.
Kerschner Co., Inc., W. R.
Ohio Brass Co.
Wood Co., Chas. N.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn & Dutton Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders**
Railway Improvement Co.

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Rome Wire Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**
International Register Co., The

**Commutator Slotting Files**
Handy Supply Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

**Commutator Stones**
Handy Supply Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
General Electric Co.
Westinghouse Trac. B. Co.

**Concrete Mixers**
Blaw-Knox Co.

**Condensers**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Connectors, Solderless**
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
Eureka Co.
Trigger Lock Reversible Controller Finger

**Controllers or Parts**
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conveyors Belt**
Portable Machinery Co.

**Conveyors, Coal & Ash**
Portable Machinery Co.

**Conveyors, Portable**
Portable Machinery Co.

**Conveying and Hoisting Machinery**
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works.

**Cord Connectors and Couplers**
Samson Cordage Works.
Electric Service Supplies Co.
Wood Co., Chas. N.

**Couplers, Car**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Cranes**
Toledo Bridge & Crane Co., The
Van Dorn & Dutton Co.

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Culverts**
Armco Iron Culvert & Flume Co. Mfrs. Assn.
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene**
Milburn Co., The Alex.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.,
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Works)**
Cleveland Frog & Crossing Co.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

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To be universally acknowledged throughout the world as the leader in a field in which there is opportunity for so much variation in quality as in electrical measuring instruments, and to hold that lead practically from the beginning of the industry to the present day, is an acknowledgment of supremacy beyond all question or dispute.

The Weston A.C. Round Pattern Switchboard Group includes Ammeters, Voltmeters, Wattmeters, (Single and Polyphase), Power Factor Meters, Frequency Meters and Synchroscopes.

These instruments have points of marked superiority over any others intended for the same purpose. Besides their extreme accuracy and serviceability, they are highly desirable for their uniformity of size and style, the openness of their scales and their legibility from any angle.

**Weston**
Electrical

## Indicating Instruments

are today the standard of the world. The original instruments invented by Dr. Edward Weston established the science of electrical measurement as it is known and practiced today, and practically every advance in the science has emanated from this company.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A.C. or on D.C. Circuits, instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

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**21 Weston Ave., Newark, N. J.**

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Montreal
Halifax
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Toronto
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Mexico City
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Buenos Aires
Santiago, Chile
Valparaiso, Chile
London
Rio de Janeiro
Copenhagen
Florence, Italy
Johannesburg, S. A.
Auckland
Sydney

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*Announcing Our New Product*

# Enamel Magnet Wire

TO those interested in Enamel Magnet Wire we beg to announce our new line of Enamel Magnet Wire, either plain, or with silk or cotton covering.

We invite correspondence, and will send samples and prices on request.

**Independent Lamp & Wire Co., Inc.**
OFFICES: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

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## Get those coils back into service—quick!

Don't let LABOR SHORTAGE hold them up in your coil department. You can't get more men—but you can save time and money by sending the coils to us for re-insulation with

**SALAMANDER**
**Pure Asbestos**

We will return them promptly—**better insulated** and more durable than when new.

"Salamander" asbestos wire excels in insulating value and cannot burn out under the severest overload.

Leading electric railways are our best customers.

**Write us for details now**

**Independent Lamp & Wire Co., Inc.**
OFFICES: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

# WHAT AND WHERE TO BUY

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., H. M.
Ford Bacon & Davis
Holst, Englehardt W.
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**
Westinghouse Elec. & Mfg. Co.

**Fabricated Steel**
Blaw-Knox Co.

**Fare Boxes**
Brill Co., The J. G.
International Register Co., The
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.
Page Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Electric Service Supplies Co.
Star Brass Works.

**Fibre and Fibre Tubing**
Westinghouse Elec. & Mfg. Co.

**Field Coils. (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.

**Forgings**
Carnegie Steel Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Furnaces. (See Stokers)**

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**
Columbia M. W. & M. I. Co.
General Electric Co.

**Galvanizing**
Cattie, Jos. P., & Bros.

**Gaskets**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gauges**
Fairbanks Co., The

**Gages, Oil and Water**
Ohio Brass Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Carnegie Steel Co.
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Railway Appliance Co.
Nuttall Co., R. D.
Van Dorn & Dutton Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs. (See Bells and Gongs)**

**Graphite**
Morgan Crucible Co.

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.
Indianapolis Frog & Switch Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Van Dorn & Dutton Co.

**Hose, All Kinds**
Fairbanks Co., The

**Hose, Bridges**
Ohio Brass Co.

**Hose, Pneumatic and Fire**
Westinghouse Traction Brake Co.

**Hydraulic Machinery**
Niles-Bement-Pond Co.

**Inspection**
Electrical Testing Lab's.

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

**Insulation. (See also Paints)**
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Freyberg Bros., Inc.
General Electric Co.
Holden & White, Inc.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Insulators. (See also Line Material)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Lackawanna Steel Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

**Joints, Rail**
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joint Co., The
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., J. G.

**Laboratory**
Electrical Testing Lab's.

**Lamp Guards and Fixtures**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent. (See also Headlights)**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Ohio Brass Co.

**Lanterns**
Fairbanks Co., The

**Lathe Attachments**
Williams & Co., J. H.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lighting Regulators, Car**
Holden & White, Inc.

**Lights, Portable Carbide**
Milburn Co., The Alex.

**Lightning Protection**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Locomotives, Electric**
Brill Co., The J. G.
General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Shop Supplies**
Fairbanks Co., The

**Machine Tools**
Columbia M. W. & M. I. Co.

**Machine Work**
Columbia M. W. & M. I. Co.
Holden & White, Inc.

**Meters, Car, Watt-Hour**
Economy Electric Devices Co.

**Meters (See Instruments)**
Electric Service Supplies Co.
Wood Co., Chas. N.

**Mirrors for Motormen**
Drew Elec. & Mfg. Co.

**Motors, Electric**
Westinghouse Elec. & Mfg. Co.

**Nuts and Bolts**
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

**Oils. (See Lubricants)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)**

**Packing**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Paints and Varnishes. (Insulating)**
Mitchell-Rand Mfg. Co.

**Paints and Varnishes for Woodwork**
National Ry. Appliance Co.

**Paving Bricks, Filler and Stretcher**
Nelsonville Brick Co.

**Paving Material**
Am. Brake Shoe & Fdy. Co.
Barrett Co., The
Nelsonville Brick Co.

**Paving Pitch**
Barrett Co., The

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co

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*Larger Illustration shows unfitness of a commercial creosote oil for non-pressure treatments. Note clouds of vapor caused by evaporation of low-boiling fractions when heated to 200° F.*

*Below is shown same open Tank treating plant as in larger illustration. Note the vapor rising from tank.*

# SAVE Evaporation Loss

## by using Carbosota Creosote Oil

There is a definite reason why Carbosota Creosote Oil goes through numerous processes of refinement, and why a commercial grade of coal-tar creosote oil is *not* suited for use in non-pressure treatments.

The illustrations above show a plant which employed a good grade of commercial coal-tar creosote oil which met specifications adapted to pressure treatments. It is *not a refined creosote oil*—with the result that considerable loss due to evaporation is to be observed. This is not only mistaken economy, but a working condition very undesirable for the labor employed.

The illustration below depicts a similar open tank treating plant in which Carbosota (Refined Coal-Tar Creosote Oil) was being used. Note the absence of evaporation, although conditions as to temperature, method of treatment, etc., were the same.

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**Grade-One Liquid**

**Creosote Oil**

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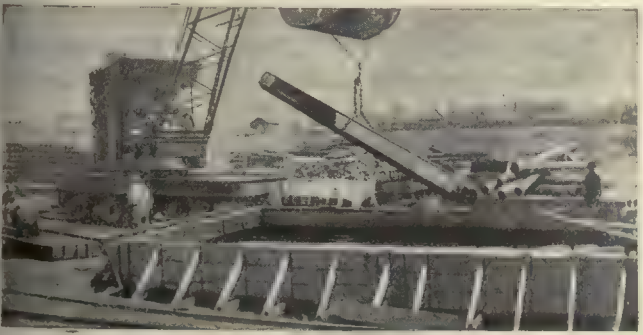
Carbosota Creosote Oil does not evaporate and is absolutely uniform. It is 100% efficient, liquid at 41°F., and consequently not subject to solidification. Will not congeal or become pasty when applied during ordinarily low working temperatures.

Carbosota Creosote Oil conforms to the U. S. Shipping Board Emergency Fleet Corporation Specification No. 128, likewise to L. S. Railroad Administration Specification R-828-A for refined Coal-Tar creosote oil.

*(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases and treatment modified accordingly.)*

Technical service, specifications, etc., may be obtained gratis by addressing nearest office.



*No evaporation here. Open Tank Process treating plant. Timbers and lumber being treated with Carbosota Creosote Oil heated to about 200° F.*

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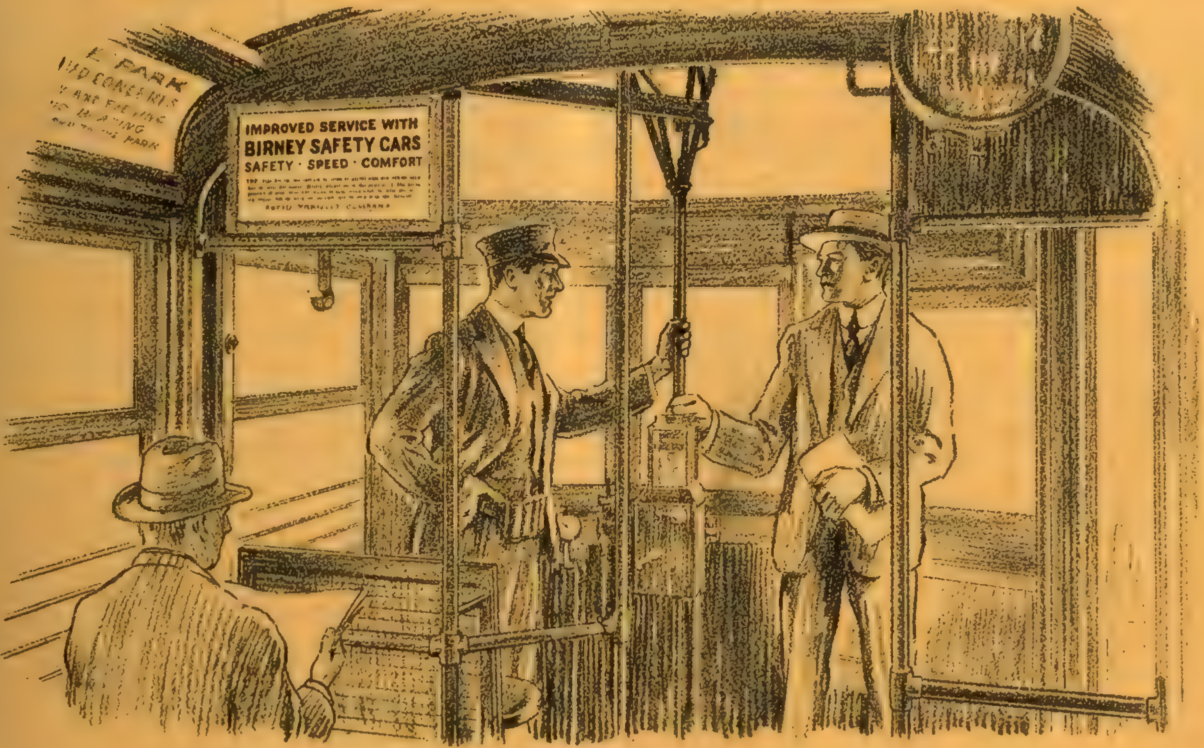

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"Thanks, but it was the car that did it. Congress or Mr. Carnegie or somebody ought to pin a medal on Mr. Birney."

To make an emergency stop with an ordinary car and to be sure of doing it right requires a cool, alert head, quick and sure hands, and lots of experience.

Motormen are human and liable to panic like the rest of us.

The Birney Safety Car takes this human failing fully into account and makes no superhuman demand.

Should the occasion call for the quickest stop possible, the car does it—almost by itself.

The man in a panic is just as efficient as the man whose pulse never misses a beat.

Just the simple, natural motion of letting up on the controller handle and the quick stop is made exactly as it should be made.

The power is cut off, the brakes applied, the track sanded and the doors put in a "balanced" position ready for opening by hand.

Interlocking the opening and closing of the service door with the car control prevents accidents.

To safety is added speed. Speed results from quick acceleration and the more frequent service the car makes practicable.

And the car includes all the comforts and conveniences that make riding pleasurable and attractive.

BIRNEY
TRADE MARK
SAFETY
CAR

*As equipped for single-end operation, the car and truck, ready for service, weigh 12,400 lb.; double-end car,* 13,000 lb.

BRILL

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR COMPANY
ST. LOUIS, MO.
G.C. KUHLMAN CAR COMPANY
CLEVELAND, OHIO
WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

## *The Result of 26 Years' Development*

Safety cars require control equipment that is light and durable.

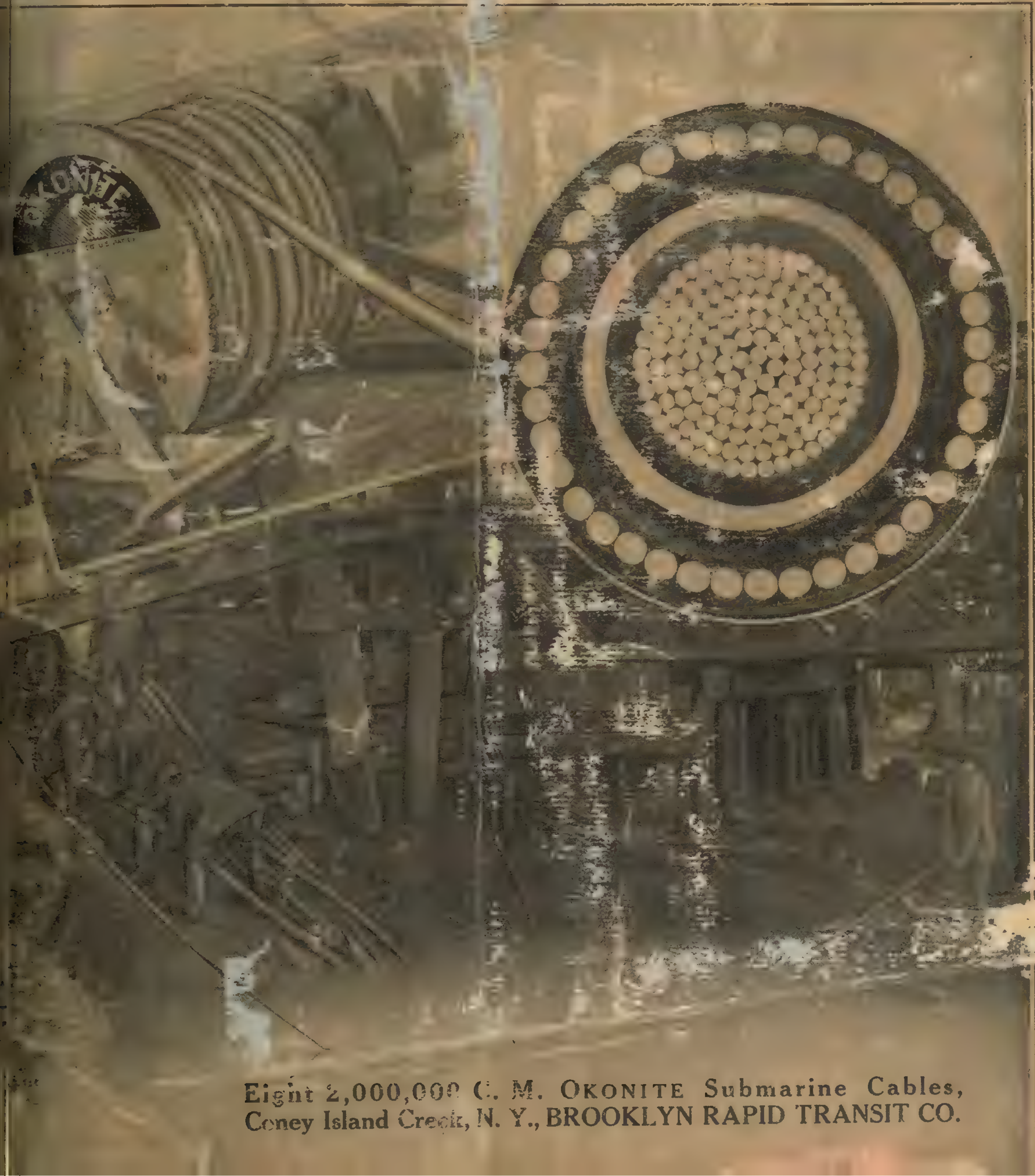
The K-63 controller, which meets these requirements, is the result of 26 years' experience with platform type control. Because of its success in this field, practically all safety cars are now being equipped with this type of controller.

**General Electric Company**

General Office Schenectady, N.Y.

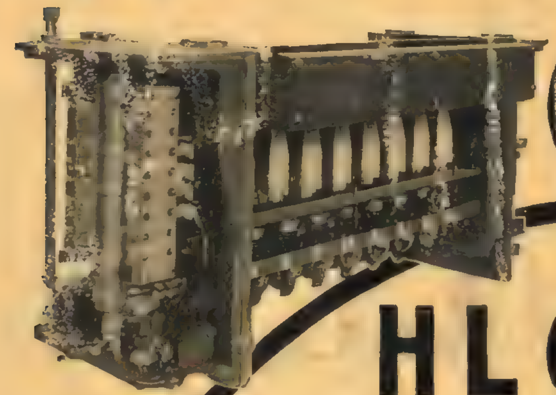
Graw-Hill Inc. May 31, 1919

# ELECTRIC RAILWAY JOURNAL



Eight 2,000,000 C. M. OKONITE Submarine Cables,
Coney Island Creek, N. Y., BROOKLYN RAPID TRANSIT CO.

# Westinghouse



# HL Control
## And
# No. 306 Motors

Distinct marks of progress, will be found in nearly every prosperous community.

---

The Sand Springs Railway Company have recently built in their own shops three new interurban cars and equipped each with quadruple No. 306-CV motors, and HL control, duplicate of the equipment employed on the majority of their older cars. Each of these new cars is of the latest design and finished inside with home grown walnut lumber.

**Westinghouse Electric & Manufacturing Co.**
**East Pittsburgh, Pa.**
**Sales Offices in All Large American Cities**

ol. 53, No. 2 New York, May 31, 1919 Pages 1035 to 1078

# Electric Railway Journal

H. W. BLAKE, Editor

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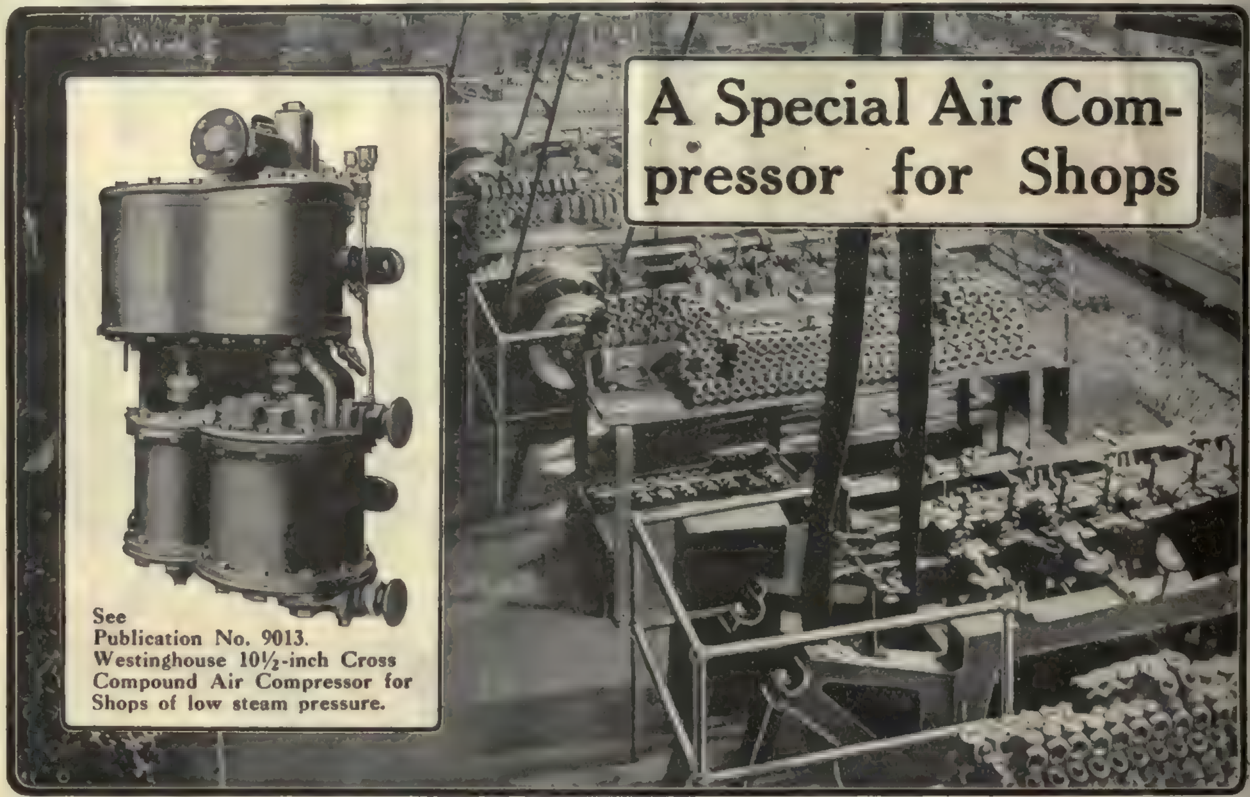
# A Special Air Compressor for Shops



See
Publication No. 9013.
Westinghouse 10½-inch Cross Compound Air Compressor for Shops of low steam pressure.

In some few railroad shops the boiler plant is too small and the steam pressure is too low to permit the installation of an air compressor.

## The Westinghouse 10½-inch Cross Compound

being specially designed for low steam pressure and large air volume, will permit pneumatic tool service where it would otherwise be impossible.

*Brake Building our Business for a Lifetime.*

## Westinghouse Traction Brake Company

General Offices and Works, Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Col.
Houston, Tex.
Los Angeles, Cal.
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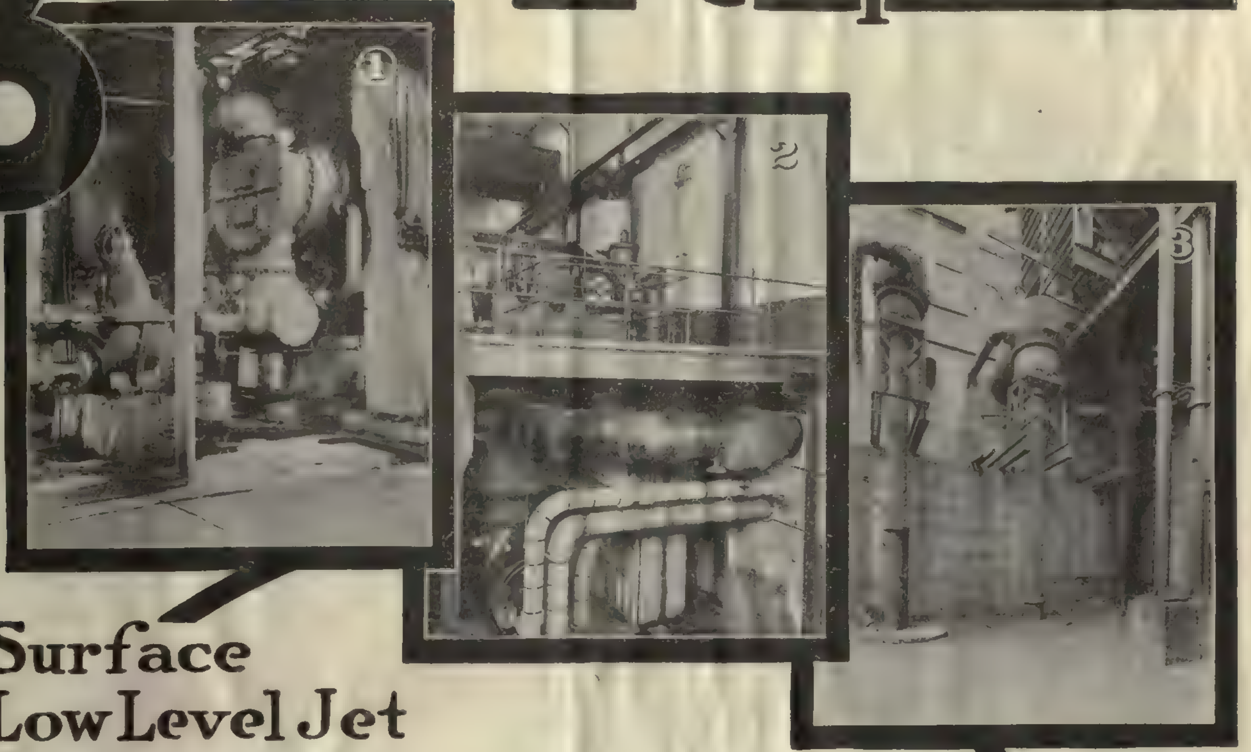
San Francisco
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.

# 3—No Compromise



**1-Surface**
**2-Low Level Jet**
**3-Barometric**

The chances for satisfactory condenser performance are three to one in favor of the condenser manufacturer who can make his application purely from the angle of plant conditions and requirements.

To have but one type of condenser is a handicap both to the purchaser and the condenser builder. Frequently it results in an unfavorable compromise and an ultimate performance neither satisfactory to the purchaser nor creditable to the condenser manufacturer.

**Westinghouse Electric & Manufacturing Co.**
**East Pittsburgh, Pa.**

W
WESTINGHOUSE ELECTRIC

# Westinghouse

# The Sluggish Line Will Soon Be The Busy Line

The biggest system has "back water" lines in which the flow of travel is "sluggish."

How about your crosstown lines for example?

Your outlying sections?

Your transfer stubs, etc.?

Would traffic on those lines be "sluggish" with shorter headway?

And once you equip those lines you will be surprised how much further you can apply the safety car on your *busy* lines!

**IT IS A SAFETY CAR ONLY**

When equipped with automatic laborless apparatus, so interlocked, that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

## SAFETY CAR DEVICES CO.

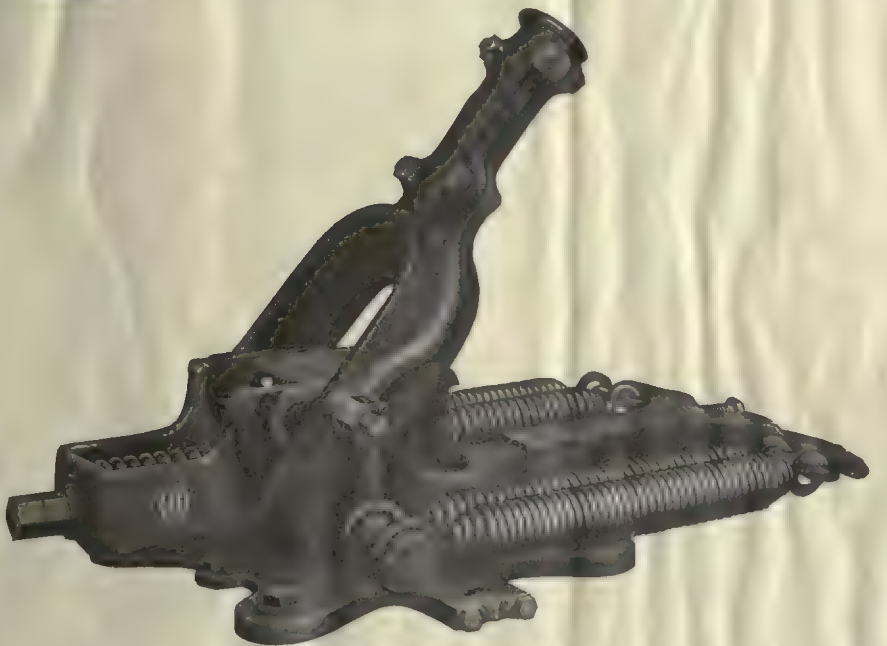
Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

| CHICAGO | NEW YORK | PITTSBURGH |
|---|---|---|
| Railway Exchange Bldg. | City Investment Building | Westinghouse Building |

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

# OB PRODUCTS

*Quality First*



O-B Base—Form 1—Patented

## O-B Base Stays Young

All the bearings have renewable steel bushings. It takes only a few minutes to renew these bushings which absorb the hardest wear.

Lubrication and inspection are simple jobs.

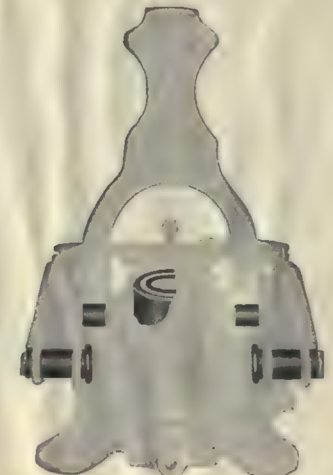
A handy hook holds the fork down while the pole is removed in the car barn where head room is minus.

One man lifts the base off the stem casting. The roller bearings are then in plain sight where they can easily be packed with grease. The rollers are caged. They stand up where they belong. They can't jam.

It is so easy to take care of the O-B Base that it usually gets what little attention it needs. So extra years are added to its naturally long life.

**THE OHIO BRASS COMPANY**
**Mansfield, Ohio**

New York
Chicago
Philadelphia
San Francisco
Los Angeles
Pittsburgh



Dark parts are renewable bushings.

One man lifts base off stem. Note the hook-down feature.

**Borough Hall—Brooklyn's Busy Plaza**

—where 250 cars are operated around Borough Hall and another 100 cars an hour up Court Street. At locations like this where replacements would delay the operation of 18 lines, only the most durable trolley wire will do—that is Phono-Electric.

**Bridgeport Brass Company**
Bridgeport Connecticut

Concreting 1330 ft. of Track Daily
with

INTERNATIONAL

STEEL TWIN TIES

200 cubic yards of concrete are being mixed and placed in 10 hours by a gang of twenty-five men on a number of Street Railway properties.

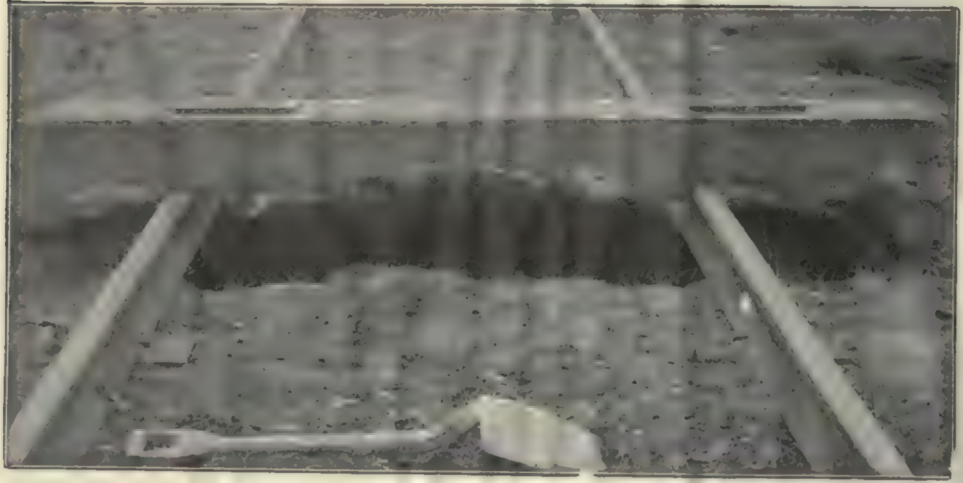
Steel Twin Tie track requires only 15 cubic yards of concrete per 100 feet of track. Therefore, the gang mentioned above can concrete completely 1330 ft. of Twin Tie track in ten hours.

Steel Twin Tie economies solve the vital problem of saving money on enforced construction with labor and materials at high price levels. Get full particulars before you lay any track.

THE INTERNATIONAL STEEL TIE COMPANY
Manufacturers of Steel Twin Ties and Crossing Foundations
GENERAL SALES OFFICE AND WORKS: CLEVELAND, OHIO

# The MECHANICAL RAILWAY TIE

# This Comparison can hardly be used too often—



**Modeled in Concrete—**

**Pounded by heavy high-speed traffic for 6 years—**

**Good as New!**

**6-inch steel 5 years under low speed traffic**

The mechanical tie here shown was placed in the tracks of the Dayton, Springfield & Xenia Southern Railway at a point where it would be subjected to the most severe use. Heavy cars at high speed have hammered this tie for seven years. Its condition shows plainly—it's as good as when it was installed.

The 6-in. steel I-beam was in use for Five Years under a cross-over near a railroad crossing, where all cars run at reduced speed. It is merely one of a number similarly dented and hammered. Just study the pictures and THINK.

*Then write us for further details.*

**THE DAYTON MECHANICAL TIE CO.**
**704 Commercial Bldg.**
**DAYTON, OHIO**

## *These People Will Pay the Cost of Good Service*

***This Service should include Faraday Car Signal Systems***

Give them Faraday High Voltage Car Signal Systems so that they can easily signal motormen to stop. Faraday Signals are dependable. Their use assures you of continued operation of signals and the elimination of batteries.

Install them in every car—*Write for literature.*

PUSH BUTTON

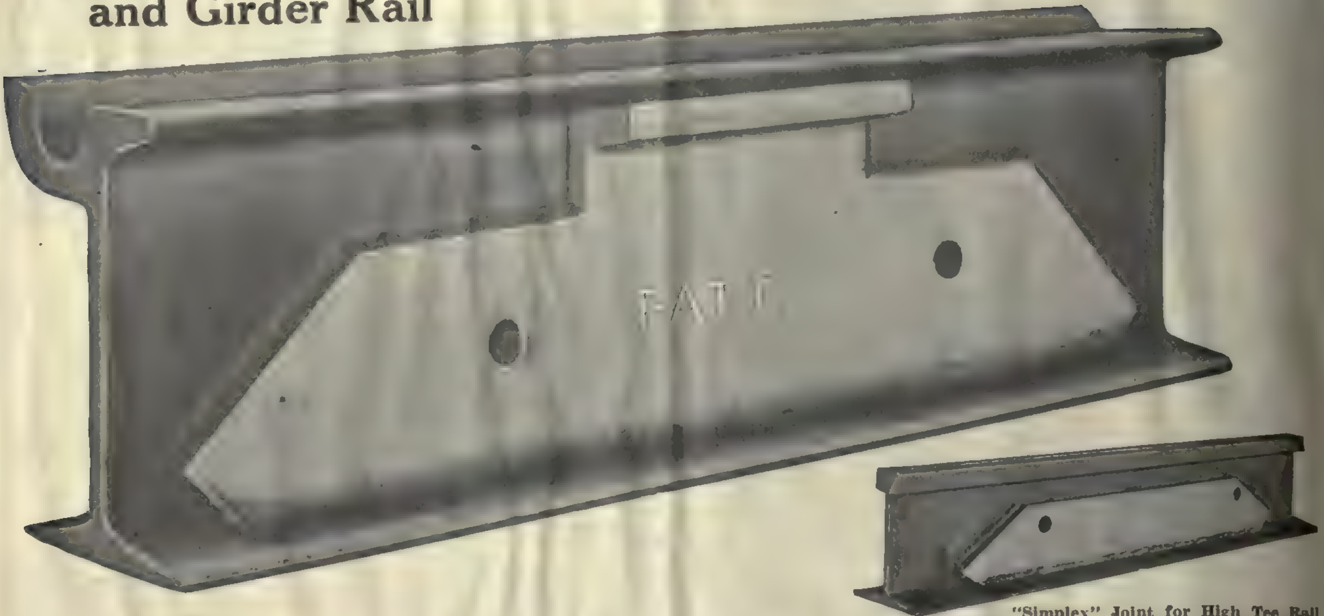
RESISTANCE

## ELECTRIC SERVICE SUPPLIES Co.

***Manufacturer of Railway Material and Electrical Supplies***

| PHILADELPHIA | PITTSBURGH | NEW YORK | CHICAGO |
|---|---|---|---|
| **17th and Cambria Streets** | **337 Oliver Building** | **50 Church Street** | **Monadnock Building** |

## "Apex" Joint for Guard and Girder Rail



"Simplex" Joint for High Tee Rail

# Indianapolis Joints

## applied by the

# Indianapolis Electric Welder

reinforce the vital spots in rails—the worn and broken frogs, crossings, etc.—with resultant lowered equipment maintenance and reduced power costs.

"Apex" Joints for Guard or Girder rail, and "Simplex" Joints for Tee rail, are adapted to severe, continuous service under varying conditions. They are made of the strongest, toughest materials and designed and built in accordance with highest engineering skill.

**Ninety per cent. of the street railways are reducing maintenance and power costs with Indianapolis equipment.**

***If contemplating any new work—get our figures on Solid Manganese Crossings***

## Indianapolis Switch & Frog Company, Springfield, Ohio

***Users of Indianapolis Patented Welders, Joints and Welding Supplies Fully Protected***

How Thermit Insert Welds make rails jointless

**3.** **"Now the molds are being clamped into position on the rails"—**

"But before clamping, two cords of asbestos soaked in molasses are applied in such a position as to form a luting around the outside edge between the mold and the rail.

"Next, fire-clay is blown into the mold with compressed air, for the purpose of sealing and in order to avoid any chance of a runout.

"That's all, gentlemen. Nothing difficult about it. Now get ready for the next picture—the preheating process."

**See these movies on your office wall!**

*We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.*

**Metal & Thermit Corp.**
**120 Broadway, New York**

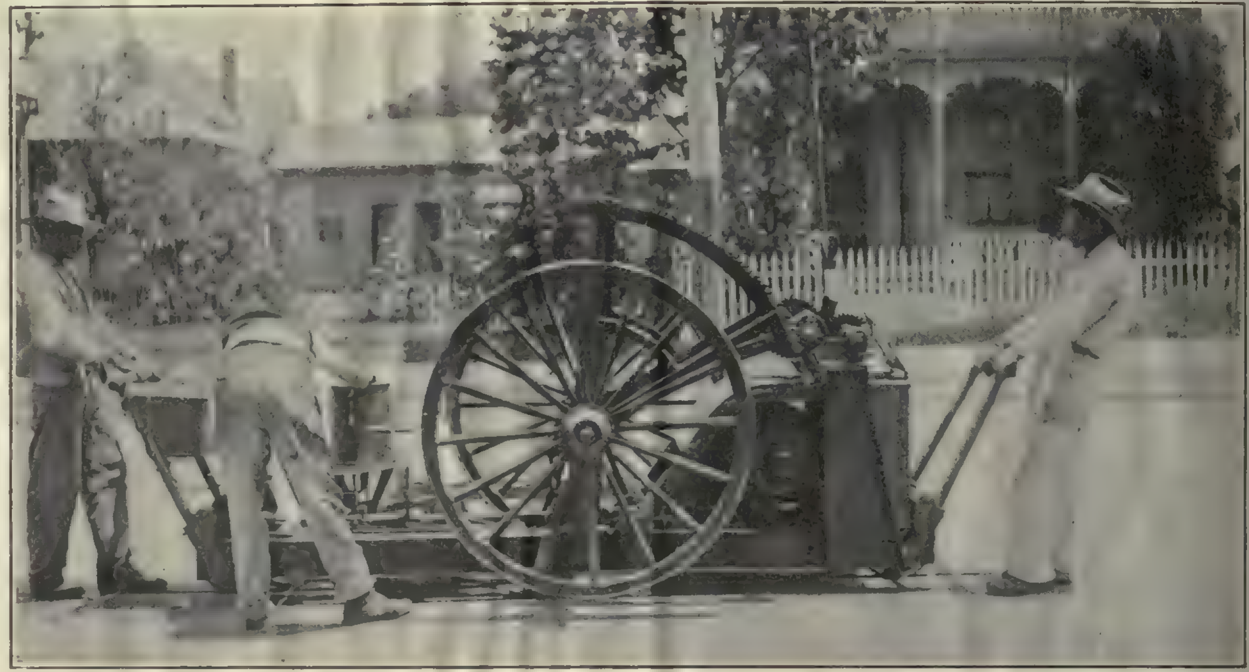
**BRANCHES**

329-333 Folsom St., San Francisco. 15 Emily St., Toronto, Ont. 7300 So. Chicago Ave., Chicago. 1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

**The Ten Steps**

1—Placing the Insert
2—The Sand Molds
3—Clamping the Molds
4—Preheating
5—Fitting the Crucible
6—Pouring the Steel
7—Removing the Molds
8—Grinding the Mold
9—Maintaining Traffic
10—Inspection trip



# 15 to 40 per cent. increase in track life by keeping joints smooth

The engineer of maintenance of way of a large traction company said some time ago:

"If we start with the new track and keep the joints planed we will increase the life of track from 15 to 40 per cent and at the same time will effect a saving in the cost of making repairs which will be necessary if the track is allowed to just 'run along.' "

# Reciprocating Track Grinders

provide an efficient and economical means of grinding joints in newly laid track to a perfect condition of smoothness, of grinding out "cups" which may later appear at joints and of eliminating rail corrugations wherever that disease appears.

An increase of even 15 per cent in the life of track means a big return on the relatively small investment necessary for track grinding. Besides which there are many other advantages in keeping track in continuously good condition.

**RAILWAY TRACK-WORK COMPANY**
**30th and Walnut Sts., Philadelphia**

# What Mary Van Kleeck Says:

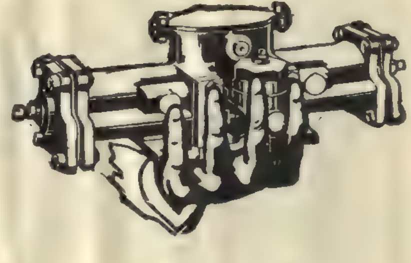
**From an Interview in the New York Times Magazine, April 27, 1919**

"They (the women conductors) were able to sit at their work, and in Cleveland the street car doors are operated by an unusually light lever."

# Yes!

# NATIONAL PNEUMATIC ENGINES Are Behind Those Cleveland Levers!

Miss Van Kleeck, who is Director of the Woman in Industries Service of the Department of Labor, may be a bit weak on the terms used in Door and Step Control, but she said something that is worth the thought of every electric railway operator whether he is employing women or men.



Your Men Will Be Mighty Grateful for

## National Pneumatic Door and Step Control

This Coming Summer and Many Seasons Thereafter.

**NATIONAL PNEUMATIC COMPANY**
INC.

50 Church St., New York

Edison Bldg., Chicago

Works: Rahway, N. J.

The Job Is Right Because He Used
IRVINGTON INSULATION

The insulation is the vital part of your equipment, and the burning out of a motor due to poor insulation is often a very serious matter.

The interruption dislocates schedules, disorganizes operation and may cause heavy losses when the product depends on absolute continuity of process.

The best insurance against troubles of this nature is to insist on IRVINGTON INSULATING PRODUCTS being used in your equipment—they have stood the test of time and trouble.

Oiled Papers
Varnished Cambric
Insulating Varnish

Oiled Silk
Flexible Tubing
Folded Papers

*Send for Samples and Data*

IRVINGTON VARNISH & INSULATOR CO.
Irvington, New Jersey.

FOR general electrical work, Holdtite Friction Tape cannot be excelled. It is heavily coated on both sides with a high grade black compound and gives long satisfactory service.

Our Armature Friction Tape, frictioned on one side only and made of a very thin closely-woven sheeting, meets every requirement of this class of taping work. It is made in white color only.

**United States Rubber Company**

ARMATURE
FRICTION TAPE
UNITED STATES RUBBER COMPANY
US
RUBBER SYSTEM
AND ASSOCIATED COMPANIES
United States Rubber Company
Mechanical Goods Division

"A Tape for
Every Trade
and Purpose"

# YOUR PROBLEM AND ITS SOLUTION

Attainment of high economy in your plant through the adoption of superheated steam demands a thorough knowledge of the working conditions in your plant.

A correct superheater must be a correct means to insure high practical economy. To be practical it must be developed from a thorough study of your plant.

You can be assured of high economy by the adoption of the Elesco Superheater. It is the means of applying the principles of correct superheating to your operating conditions.

Let us study your plant carefully and by cooperation with you apply our experience to your problem. You can then be assured of the economy you demand.

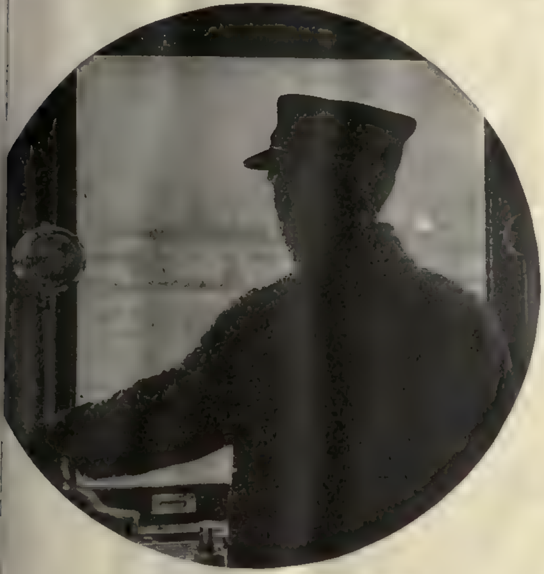
*Ask us for Bulletin BT-1.*

**Designing engineers and manufacturers of steam superheaters for all purposes.**

## Locomotive Superheater Co.

**General Office: 30 Church St., New York**

Chicago, Peoples Gas Bldg. Pittsburgh, Oliver Bldg.



"He can check it with his own watch"

# Your Motorman Has Faith Only in What He Understands —and He Understands the

# Arthur Power Saving Recorder

He may not know exactly what a kilowatt-hour is; or even what a coasting percentage is. But he *does* know that if he is running his car with power on a shorter time than formerly, he is saving power. That's what the Arthur recorder tells him—and it tells him *in minutes,* so he can understand.

Once the motorman is interested in how much he can run his car with power shut off, he soon learns to take advantage of every point that helps *his own* record. For instance—

**By coasting whenever possible.**

**By not crowding too close to the car ahead.**

**Not fanning the brakes.**

**Not allowing the brakes to drag.**

**Not applying power and brakes simultaneously on down grades.**

**Not running ahead of time, or leaving terminal or end of line late.**

**Not keeping the power on to unnecessarily produce high and dangerous speeds.**

**The net result is power saving, fewer accidents and increased life to brakeshoes, wheels and car equipment.**

Arthur recorders are inexpensive to purchase, install and maintain.

*Write for further information.*

"It talks the language of the Motorman"

**The Arthur Power-Saving Recorder Company**
**Second National Bank Building, New Haven, Conn.**

# Study the Comparative Results of Open Hearth and Electric Steel Armature Shafts for Electric Railway Service

Here they are

(Columns showing results obtained in test)

| Properties | Open Hearth Steel | Electric Steel General Steel Co. |
|---|---|---|
| Ult. Strength, lbs. per sq.in. | 91,200 | 107,700 |
| Elastic Limit, lbs. per sq.in. | 46,000 | 69,950 |
| Elongation in 2 in. | 22.2% | 23.5% |
| Reduction of Area | 44.8% | 50.0% |
| Fracture | Silky, small cup. | Silky, full cup. |
| Elastic—Torsion, lbs. sq.in. | 16,750 | 33,700 |
| Shearing Strength, lbs. sq.in. | 62,400 | 76,000 |

The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a "Pittsburgh" electric furnace. Both were the normal product. Heat treated in each case.

We are equipped to handle the forging of axles and armature shafts from our own manufactured electric furnace steel.

*We Solicit Your Inquiries*

## GENERAL STEEL CO.

Public Service Building, MILWAUKEE, Wis.

# The "Jumping-Off Place" to the Gold Fields

Kansas City was that in '49 and the early fifties because it was then the last completely equipped outpost of commerce west of the Mississippi.

To the men of that generation Kansas City was a busy center of commerce and from that day to this it has been a "starter" of many things for the greater service of the people of the Middle West.

It was one of the first cities in this country to develop and put into service the idea of a "Union" station for all the railways entering its gates.

The picture shows that early union terminal as it appeared forty years ago. Kansas City was the first community equipped with the overhead trolley system for street railways.

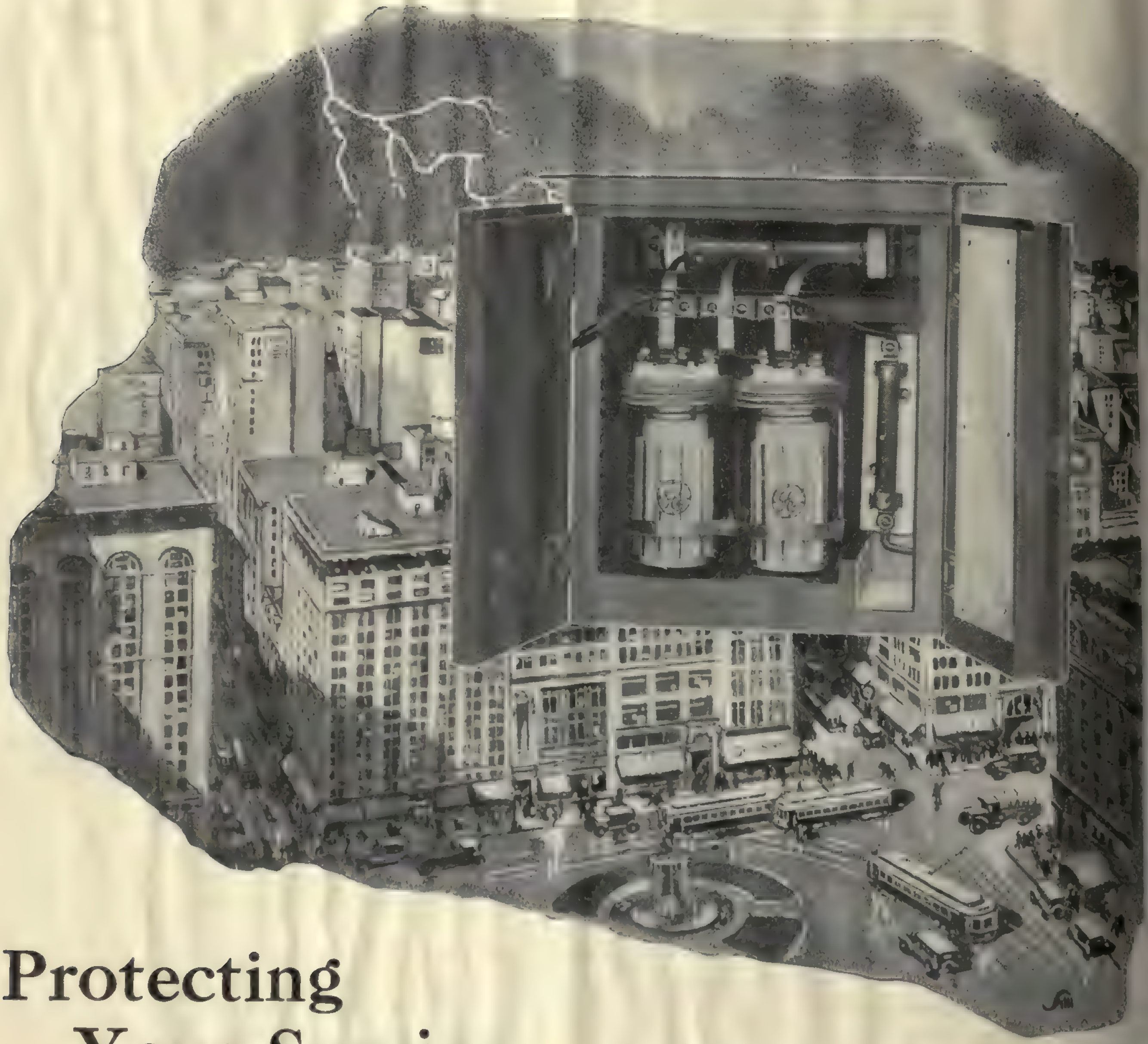
The impetus which rapid transit gave the city's growth was quickly appreciated and other communities throughout the country rapidly developed the same methods.

# alena Oils *and* Galena Service

gave an impetus to the art and science of lubrication that has enabled that art to keep in step with the constantly growing and changing needs of the railway industry, and have always retained their positions in the forefront of the lubricating industry.

# Galena-Signal Oil Co.

Franklin, Pa.



# Protecting Your Service

Electric storms have a way of appearing at the most unfavorable traffic hours. A car put out of commission then means congestion, delay and consequently irritated patrons.

Companies that formerly pulled down their trolleys now find that they can operate throughout the heaviest lightning storms through the use of **G-E aluminum arresters** on their cars.

**General Electric Company**

**General Office Schenectady, N.Y.**

33F-3

# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

*lume* 53 New York, Saturday, May 31, 1919 *Number* 22

### ilize the Skip Stop to Increase Schedule Speed

DURING the war period the United States Fuel Administration furnished the backing needed to t the skip-stop idea "over" in many quarters. Fuel ving was the immediate goal, with general operating onomies on beyond. The operating economies were edicated upon the increasing of schedule speeds to sorb the time saving, in other words on the taking up slack in the schedules. The result with respect to el saving was gratifying; that with respect to time ving, disappointing. It is not too late to speed up the rs. The public is entitled to an increment of speed r each eliminated stop. The railway profits by rnishing it.

### hat the Federal Commission Could Do

T IS INDEED a hopeful augury for the future that President Wilson has decided to appoint a federal mmission to study the electric railway situation. If is action should help to secure a higher net return for e electric railways, it will be some reparation for the eavy wage burdens which were imposed on them by the ar Labor Board. This cheerful prospect must have ccurred to thousands of investors when they read a few ays ago that President Wilson had cabled his sanction or the plan mentioned.

Ever since the War Labor Board made public its first ndings last August the distressed utilities have continued to look to Washington for relief, their experience ith city and state authorities having convinced them hat the recommendations of Messrs.Taft and Walsh for ympathetic consideration from regulatory bodies would ear little fruit. Now it appears that the nation's leadrs have been impressed with the necessity for action, nd millions of investors will wait anxiously for results vhich may turn the tide away from the abyss of disaser. We can only express the hope that they will not e disappointed and that the history of the new commission will be more cheering than that of the War Finance Corporation, several of whose utility patients lid not survive the delayed treatment.

It is announced that the proposed commission will have n its membership representatives of various organizations most concerned with the fate of the electric railways. This statement holds the promise of an intelligent handling of the problem, and if effective relief should call for new legislation there is hope that such measures will be put into force by the present Congress which now must be convinced that national prosperity is closely connected with the well-being of the railway industry.

Electric railway interests might well submit to the consideration of the new commission the suggestion outlined at the recent meeting of the Chamber of Commerce of the United States by Samuel W. Fordyce, Jr., which was mentioned in our issue of May 3. This plan called for a congressional act by which utility bonds would be put on the same basis of tax exemption as municipal bonds. That the corporation tax burden is also a heavy one for electric railways is shown by the 1912 census wherein it is indicated that taxes consumed 13.8 per cent of gross income remaining after payment of operating expenses. While it is not expected that the lifting of all these taxes would be contemplated in a federal law, a considerable part of the burden undoubtedly could be removed.

The advantage of tax-exemption securities was argued in a plan recently offered for a new franchise in Chicago. It was shown there that about $1,000,000 would be saved in fixed charges annually by the tax exemption feature and there would be less likelihood that increased rates of fare would be necessary. There may be obstacles in the way of the plan suggested by Mr. Fordyce, but this and the many other suggestions for the elimination of non-transportation charges should be weighed carefully by the new federal commission when it is organized and gets down to work.

### Putting "Pep" Into Every-day Work

MANUFACTURERS tell us that there has been a "letting down" during the last two years in the sense of personal responsibility of workmen, in spite of the great increases in wages that have accompanied the war activity. Attention has been called editorially in this paper to the same fact in connection with construction and maintenance work on electric railways. The same condition undoubtedly exists in other lines of work in this field. The period of reconstruction which now confronts us will require a quickening of effort all along the line. There is bound to be a labor shortage soon, and the output of the individual must be increased, whether he is molding from patterns in a foundry or retailing transportation with the aid of a trolley car.

In a talk before the Public Service Railway company section last week, Alexander Jackson stated some plain truths very forcefully, with particular reference to the transportation department. The talk is abstracted elsewhere in this issue. The speaker's thought was that each man holding a position of any responsibility in the department has a wonderful opportunity to improve the character of the service with the end in view of pleasing and serving the public. The secret of success, if secret it be, is in the attitude of the individual toward his job. If the attitude is that of a "time server" the work is going to be slipshod and constantly on the down grade. If the attitude is that of one whose constant desire is to make the local service the "best ever," then the carhouses will be neat, the headways will be maintained, the car windows will be clean, reports will be accurate and complete, etc. If all of his men held the latter attitude the day of the superintendent's millennium would be in sight.

### There Is a Better Outlook in Railway Power

IT IS encouraging to observe lighter skies in the railway power supply field. Here at least seems to be a department in which costs can be somewhat reduced as time goes on, and as the handicaps of the war period diminish. The difficulties of the past two or three years need not be detailed. Every chief engineer and manager knows how hard it has been either to generate or to buy electrical energy on entirely satisfactory terms, in view of the increased cost of coal, labor and supplies, the burdens of a poor load factor, and the uneven character of the fuel available in so many cases. The last factor in station inefficiency attained a climax in the severe winter of 1917-1918.

Fuel costs are still very high and central station rates still generally embody coal clauses. Wages are high too, yet there is reason for optimism. Electric railways which generate and distribute their own energy supply are now in a position to look outside and in many cases will find it to their advantage to investigate the possibility of combining their generating and purchasing abilities. The central stations are generally somewhat underloaded at present, owing to a falling off in power output since the armistice was signed and to plant expansion carried forward during the latter part of the period of hostilities. Great strides toward economical power production and distribution over considerable areas are being made through the interconnection of plants. While it is true that in many cases the interconnection of central stations and railway plants is handicapped by differences in frequency or in current type, other instances occur in which interchange can be handled with economy to all interests involved. The time is ripe to analyze the possibilities of purchasing part of the energy requirements by utilizing surplus central station power, and in some cases, certainly, non-overlapping railway and central station loads will permit a reasonable degree of interchange through appropriate equipment.

Electric railways operating in adjacent territory may well consider the possibilities of plant interconnection and load subdivision. The "electrical island" policy is out of date. Then, inside the company organization, the analysis of schedules in relation to power requirements is worth while. Of course, fundamentally, traffic needs determine schedules, but there are many cases where minor adjustments one way or the other with respect to the clock and plant load curve would not affect the patronage materially, and might help to raise the load factor of the station, that *bête noir* of the operating engineer. If fuel costs stay high and little chance of reductions of magnitude yet appears, a good deal of valuable work can be done in the way of analyzing the coal available, studying the combustion problems of local installations and looking into bonus systems for operating personnel. The present price of copper is more favorable to the revamping of feeder and return system layouts than for some months, and the growing use of the safety, light-weight car should be accompanied by thorough studies of its relation to power plant costs. As contracts for electrical service extended under war conditions expire, there may also be an opportunity for railways to put a better foot forward and make a more advantageous bargain for the next period of supply. Where rotary converters or synchronous motors are utilized in supplying the direct-current railway service from an alternating-current system, the effect on the central station power factor is helpful, and should have a positive money value in contract negotiations. The automatic substation also presents opportunity for cost reduction in the distribution system.

In brief, the war brought about tremendous changes in the work of power production which were reflected in increased costs all along the line, but since loads, traffic, rolling stock units, coal quality and electrical interchange possibilities are now changing from mid-war values, it is time to renew the ever-important investigations on behalf of minimum energy cost delivered at the trolley. Difficult as is the path of the electric railway to-day, every advantage should be taken of those phases of the electric railway power demand which are assets to the power generator and distributer, and no manager should hesitate to "stand up in his boots" and defend those assets on behalf of making a good trade in buying power. New opportunities for team play within the railway organization are at hand, and from the watt-hour meter on the car to the calorimeter in the consulting fuel expert's laboratory, forces should be combined to cut the cost of electrical service utilized in traction operations.

### The International Association, Reconstructed, Begins Again

ALL electric railway men in this country who are acquainted with the splendid results achieved by the International Tramway & Light Railway Association during the thirty years of its life up to 1914 will be much pleased to hear that plans have been completed by which it will take up its work again. Brussels, its headquarters, was for many years the city from which capital flowed all over the world to build and operate tramways. It was in Brussels that most of the large international syndicates, including the tramway syndicates, had their domicile, presumably because the neutrality of Belgium was guaranteed by its larger neighbors and it was thought that a Belgian company would be less apt to be affected by wars and international jealousies than would a company in one of the larger countries. But 1914 showed the error of all this. The International Association has now been reincorporated to include only tramway companies and individuals in the Allied countries or in neutral nations, and it hopes to renew its activity, broken off when the war began. It is pleasing to note that its announcement to this effect is signed by President de Burlet, who occupied that office in 1914 and was for many years general manager of the national light railway system of Belgium and later was government inspector general of bridges and highways. Mr. Camp, the association's efficient secretary, also survived the war and occupies his old office. We welcome the re-created association and wish it all success in its future work of service.

## If Milk Prices Can Be Raised, Why Not Fares?

THE people of Chicago had an effective illustration recently of the difference between a public utility and another line of business which dealt with as great a necessity for the public, possibly, as urban transportation. The milkmen of the Chicago district had been on strike several days and there was much inconvenience and some suffering from the sudden shutting off of deliveries of this essential lacteal food. The drivers insisted on an advance of $9 a week in their wages and the employers said they would stand firm against an increase in costs of operation which they could not afford. A federal mediator came along, got the leaders of both sides together, and the next morning milk was being delivered as usual—but the people found the price of milk had gone up 1 cent a quart. There was the usual stir of indignation but the consumers had to have their milk and the new rate was established as another item in the increased cost of living.

Only a few weeks before, the Chicago car-riding public was made happy by a decision of the State Utilities Commission refusing to allow an advance in rates of fare. The commission said that the proposed rate would impose a burden on the people greatly in excess of any apparent deficit in the year's net income. Evidently there were no such considerations in the discussions which led to the increase in the price of milk, although it was reported later that the 1 cent advance would produce revenue much in excess of the requirements to pay the drivers the extra wage demanded.

The contrast in these two cases was commented on freely in Chicago. It is the same old story of people submitting to increases in the cost of living over which they have no direct control and fighting hard against extension of any clemency toward utility companies which happen to be bound by contract to a fixed rate of fare. Undoubtedly, many persons will be impressed with a sense of the unfairness indicated by comparison of the two situations, but will it lead to any different treatment for the transportation companies? We doubt it. Instead, the people are likely to take all the more pride in the feeling that there is at least one situation which they can control and they will insist that the ordinance contract be adhered to.

Perhaps this is human nature, to glory in the feeling of authority. It is apparent, however, that the public still needs to be educated to the fact that in insisting on their pound of flesh they may be doing their community irreparable harm. There are few, if any, instances where city officials have shown that they were impressed with this fact and have urged the public to extend a helping hand to the utilities which happened to have the bad end of a bargain. Probably it is not good politics in the present state of the public mind to urge such clemency.

The suggestion has been made that the electric railways which have been caught by rising prices with an unprofitable contract are no worse off than breweries which are being put out of business just now. The breweries do not ask the public for recompense for losses suffered, it is said, so why should the railways? No one, we believe, will really insist on this as a fair comparison. Neither the law nor the public is asking the breweries to continue business at a loss, as they are the railways, and capital and labor engaged in making beer can find other fields for their employment.

The great necessity of the utility situation, as we see it, is to impress the public—including the politicians—with the fact that their prosperity and the good name of their communities are bound up in the prosperity of the railway companies, and that such prosperity is not possible under terms agreed to years ago when world conditions were so different. Publicity, and more publicity is the crying need of the hour. Fair treatment to the electric railways must follow as the day the night.

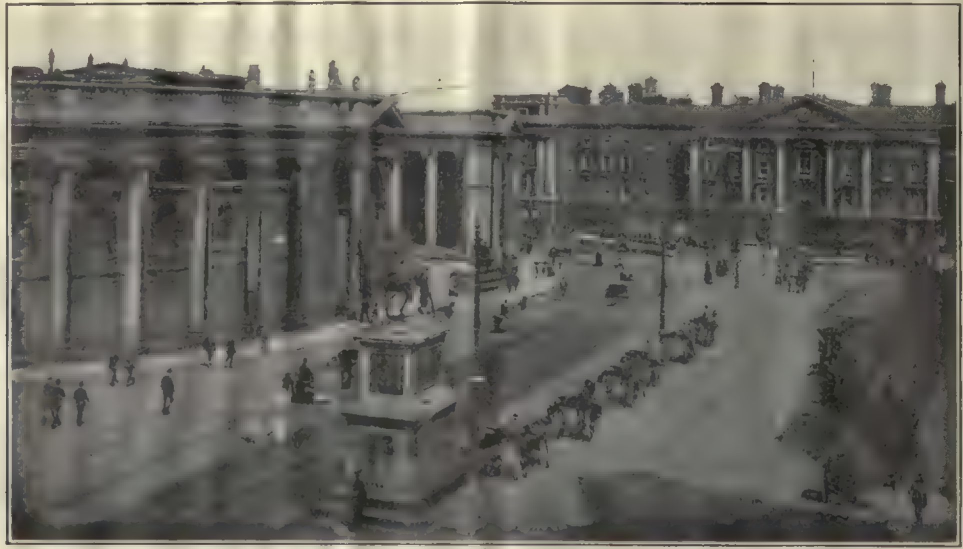
## Traffic Grows Faster in East than in West

ANALYSIS of the comparative census data for electric railways, printed in our issue of May 3, presents a striking illustration of the lack of development of the industry in certain sections of the country. Taking, for instance, the item of "revenue passengers carried" in the year 1917 as compared with 1912, we see that the Pacific states showed a decrease of 2 per cent and the Mountain states an increase of only 5 per cent, while the average increase for the country was 15.5 per cent—the East-North Central states leading with a gain of 25.6 per cent. The Pacific and the Mountain states showed a small increase in gross revenue and the former group were the only states in the country which showed a deficit in net income. One need not look further for evidence of the hurtful effect of jitney competition and the high labor and material costs which prevail in the Far West.

While the preliminary figures issued by the Census Bureau do not include a showing as to investment in the industry for the recent period, no one expects that it will indicate any such increase in capitalization as the 24 per cent from 1907 to 1912 or the 63 per cent gain in 1902 to 1907. While one explanation of this probably is the fact that there has been no great development of the industry as in former periods, another undoubtedly may be found in the lack of encouragement to capital since regulatory bodies began to bear down on the transportation companies.

The census figures have been made public at a time when one who can read history and make prophesies from statistics may find in them a basis for serious thought. In the present period of nation-wide development one would not think the majority of people have to be convinced that it is worth while to safeguard a business which handles the entire population of the United States 100 times over in a year—a business which in 1917 paid out more than $267,000,000 in salaries and wages to its employees—a business which now represents perhaps more than $6,000,000,000 of invested capital.

And yet if the census study had covered also the year 1918 we believe that the showing of declining net income would be the most effective propaganda to persuade the thoughtful average citizen that the critical situation of these public utilities bodes no good for the prosperity of the nation particularly of the communities which they serve. Study of the completed census report when it is issued should be recommended to those who are most concerned with the future of the electric railway companies.



BANK OF IRELAND AND TRINITY COLLEGE, COLLEGE GREEN

# The Zone Fare in Practice

BY WALTER JACKSON

## DUBLIN—PART I

### Dublin's Housing Problem Arose From Activities of House Jobbers in Old Wealthy Sections and From Immigration of Laborers to City From Country Because of High Wages—Tramway Company Has Built 220 Houses for Employees

> In large manufacturing centers it is the rule, rather than the exception, for five or six men to be found sleeping in a room which will not properly hold more than two, and it is a common thing for the same beds to be occupied day and night by different shifts of workers. The sanitation is often deplorable. There are many large houses now occupied by several families in which there is only one toilet for general use. Many of the poorer tenements have no water supply, and the tenants have to fetch their water from a pump or faucet in the yard. The bath tub is an unknown luxury. In many cities only a very small proportion of the houses of the working classes are connected with the sewers, while the privy and cesspool are everywhere.

NO, THIS IS NOT a description of conditions in some thousand-year old city of Europe, but in our own United States! The quotation is from an article on "The Problem of Industrial Housing," written by Leslie H. Allen for the December, 1917, issue of *Industrial Management*. To continue the quotation:

> Localities as far apart as California, Texas, Pittsburgh, Boston, Fall River and Bridgeport have a like state of affairs. . . . In most American cities few houses have been built for the unskilled workmen, and, as a result, they are very badly housed and overcrowded.

Evidently, the universal fare hitherto prevalent in the American communities named is not of itself a cure-all for congestion.

#### THE HOUSING PROBLEM IN DUBLIN

Dublin, as regards the origin of its housing problem, is unlike many other cities because its tenement houses are not a deliberate creation. The congestion in Dublin, according to the 1918 report of the municipality's housing committee, arose from the fact that the large old mansions and residential quarters built by the nobility and gentry during the earlier periods gradually drifted from their private residential character and ownership into the hands of the house jobber, whose only concern was to extract the best return for his investment by letting out the rooms in tenements. Numbers of the successors of the original occupants have ceased to retain their town houses in the city, the rapid means of transit gradually transferring the residential life of the wealthy classes from the city to the suburbs. On the other hand, large numbers of the laboring classes have migrated from the provinces to the city, attracted, no doubt, by the large works in progress from time to time and the comparatively high wages prevailing under city conditions.

The report contains a survey, street by street, of the north side of Dublin, showing that the degeneration of many thoroughfares from wealthy to workmen's sections began to be perceptible as long ago as 1850 (a generation before the tramway period). The conclusion of the committee is that "had the municipal area been extended from time to time in accordance with the city's natural expansion, the question of housing the working classes would not be so acute, and the expenditure now required in that direction would be more equitably distributed."

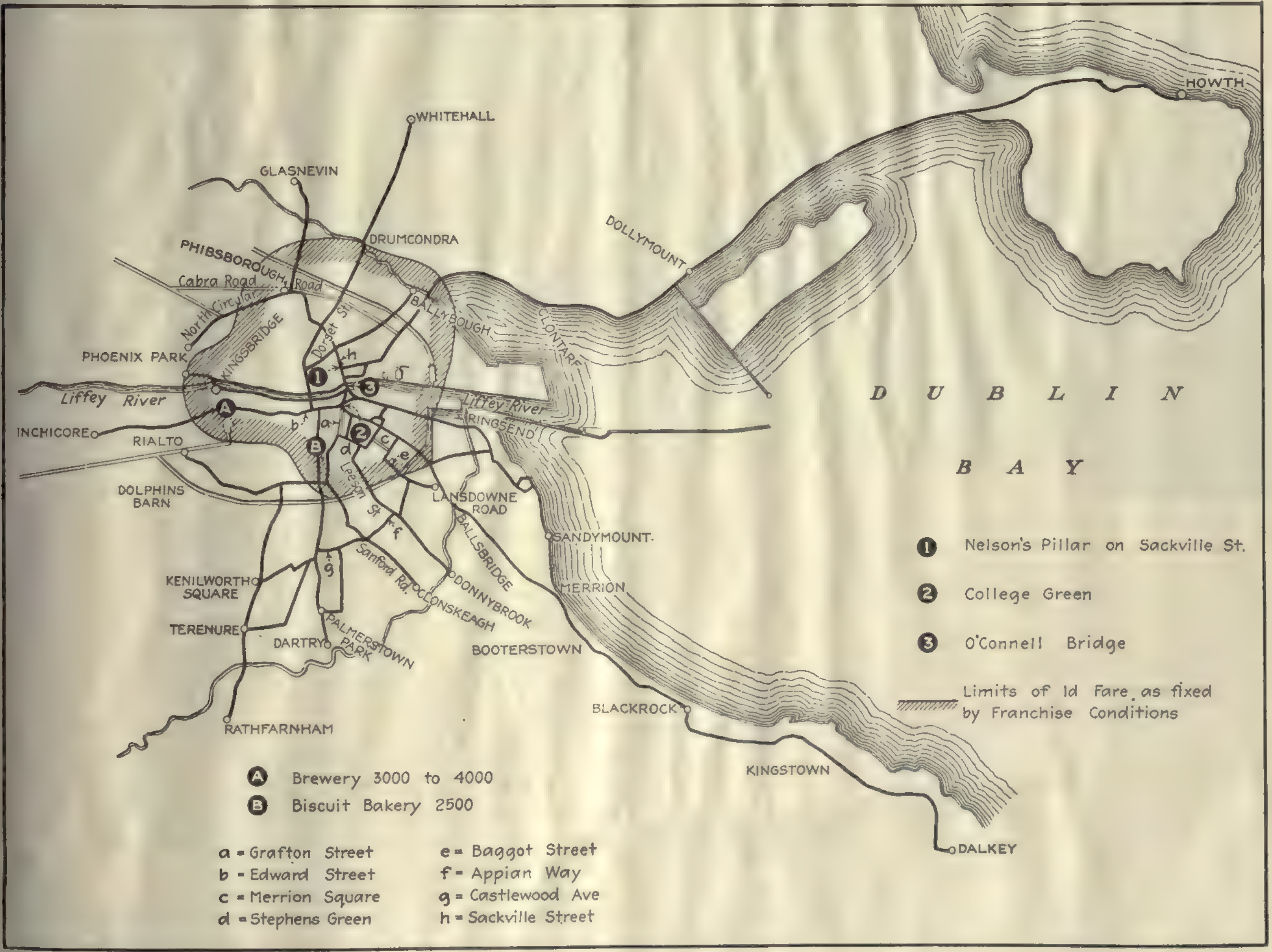
The earlier way of attacking the slum question in Dublin was by the acquisition, destruction and reconstruction of the original property. This proved prohibitory in cost inasmuch as the locations were close to the business district and highly profitable to their landlords. More recently, the plan of purchasing the cheaper, open land near or beyond the city boundaries has been followed in the hope that ultimately the tenants of the slums would move out of their own accord. Curiously enough, the same war that has slowed up the fulfillment of the housing plans, through the enormous increase in building costs, has also demonstrated that, once the workman has learned to love the country because of his work in the war garden allotments, he no longer accepts the stuffy tenement as a matter of course.

In a "Report on Dublin Housing" made in 1918, P. C. Cowan, chief engineering inspector Local Government Board, shows the difference in cost between slum and suburban areas in Dublin. Mr. Cowan states that the average cost per acre for acquiring eleven slum sections with a total area of 18 acres, between 1886 and 1912, was about £6,160, which with the cost of clearing the streets, etc., gave a total of £8,798 per acre apart from the cost of building. On the other hand, 12½ acres purchased at Inchicore within the city boundary in 1903 cost £320 per acre, and 22 acres of the Fairbrother's Fields, purchased in 1914, cost £717 per acre. According to the city by-laws, all new streets must have footpaths (sidewalks) with a concreted surface, chisel-dressed granite curbing and a paved channel 3 ft. wide on each side. These items alone, with footpaths 6 ft. wide, would cost £4 per lineal yard. But even this construction, which Mr. Cowan regards as unnecessarily elaborate, would not have cost in 1918 more than £1,046 per acre, including sewer, gas and water mains.

The pressing nature of the housing problem is well indicated by the following: From 1914 to 1917, inclusive, 956 tenements housing 3989 families were closed as unfit for habitation, but during the same period the city built only 327 new houses and other agencies a much smaller number. Moreover, the houses remaining open deteriorated at a more rapid rate than in peace times because of the difficulty and the expense of maintenance. Mr. Cowan's estimate as of January, 1918, is that at least 16,500 new houses and 13,900 reconstructed dwellings are imperatively needed. The corporation of Dublin has already built and is the landlord of 1880 houses. The new houses contemplated would be similar at least in size to the one-family houses constructed in recent years. A few flats might be built for two to four families, but they would be a small percentage of the total construction.

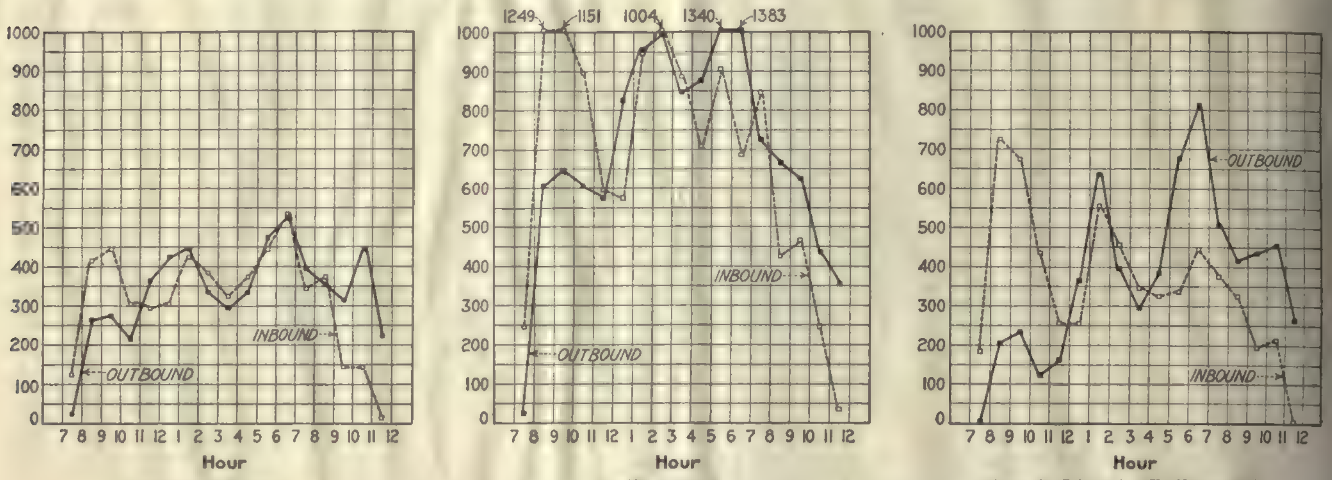
Some of the existing three and four-room houses built by the city are shown in the illustrations on page 1043. It should be noted that they are built along the sides of a plaza, although there is no garden space as contemplated for the suburban area. To an American familiar with the possibilities of the modern apartment house with its private courtyard, roof playgrounds, etc., these one-family houses appear to be a wasteful use of extremely costly space. American apartments are not to be compared, of course, with the old-fashioned tenement, such as the Dublin municipality built a generation ago.

At the present time, 1919, approximately 40 to 45 per cent of the population of 390,000 in Dublin are in need of better housing. It would not be practicable to build all the new houses within the present limits of Dublin,



ROUTE MAP OF DUBLIN UNITED TRAMWAYS

nor would it be desirable, in Mr. Cowan's opinion, to intrust the spending of millions of dollars a year to a council too responsive to local selfish influences. He has therefore recommended that the houses be built under the auspices of a board representing the national government (which is expected to loan the money at low rates of interest), the city of Dublin, the urban districts of Rathmines and Pembroke, and Dublin County.



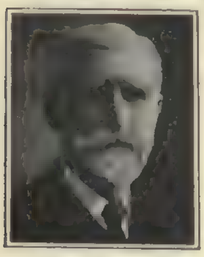
Inchicore Line Dalkey Line Howth Line to Dollymount

DUBLIN LINES HAVE GOOD TRAFFIC PEAKS IN THE MIDDLE OF THE DAY, TOO

It cannot be said that this proposal meets the unqualified approval of the Dublin Council, and the resulting differences of opinion, plus the war aftermath and local politics, are seriously retarding the advancement of the several housing projects.

### HOUSING AS RELATED TO TRANSIT FACILITIES

The foregoing facts regarding the housing situation in Dublin have been recited at some length to show how little the electric railway conditions have had to do with congestion. It is surely no advantage to a tramway to have a large proportion of the population within ten to fifteen minutes walk of the working and shopping centers. For revenue purposes, such a population is non-existent. This is obvious enough from a comparison of the Dublin passenger-per-car-mile statistics with those of other cities in the United Kingdom where the population is distributed more evenly, and from a study of the Dublin routes and their characteristics. Mr. Cowan evidently does not hold the tramways to blame, for he refers to them as "excellent," and notes with interest the following: "The longest extensions are for the service of places which have long had a railway service (steam), such as Clontarf, Sutton, Howth, Merrion, Blackrock, Kingstown and Dalkey. The tramways naturally enough followed development. The time has now arrived when they should take a leading part in the development of such areas as Cabra and Crumlin."



No article on the Dublin United Tramways could be complete without some reference to WILLIAM MARTIN MURPHY, chairman of the company for a generation. Mr. Murphy is one of the great pioneers of the electric railway industry. He electrified the Dublin system, the first work of the kind on a large scale in the United Kingdom. He financed and built the Belfast horse lines as far back as 1879, and he promoted, financed or built—and sometimes all three—the Isle of Thanet, Hastings, Poole & Bournemouth, London Southern, Cork and Paisley (Scotland) tramways. He also constructed railways in the Gold Coast Colony, West Africa, and partook actively in general railway and lighting projects in the United Kingdom. Mr. Murphy's activities, however, have not been limited to his public utility labors. Parliament saw him as representative of St. Patrick's Division, Dublin, from 1885 to 1892. In 1905 he founded the *Irish Independent*, the first half-penny (now penny) morning daily newspaper in Ireland. In 1907 he was the principal promoter and committee chairman of the Irish International Exhibition in Dublin, and during 1912 and 1913 he was president of the Dublin Chamber of Commerce. Since February, 1915, Mr. Murphy has shown his public spirit in a most timely way by serving as chairman of the general finance and general purposes committee, Dublin Castle Red Cross Hospital. That the Dublin United Tramways has so good a record to show under the most trying conditions of recent years is due in large measure to the continued personal attention that Mr. Murphy has been able to give this undertaking because of his residence at Dublin.

Although it can hardly be said that the Dublin fare system has acted as a deterrent to development, Mr. Cowan takes the extreme view recently put forth also by Ralph S. Bauer, Lynn, Mass., namely, that the provision of cheap or absolutely free transit is but a logical step from the free use of the public highways, and that this would be an immense help in securing healthful houses "on an economic basis." As the Dublin tramways are not owned by the city, this proposal is not likely to do more than create some embarrassment for the company in trying to run its *own* affairs on an economic basis.

In view of the fact that the wages of all classes of labor have risen in greater proportion than tramway fares, it might be well to see if new suburban houses do not fill up without the stimulus of free transit. It is a safe prophecy that whenever the city erects the 600 houses at Marino in the Clontarf section and the 370 dwellings laid out for Fairbrother's Field on the south side, it will not have to cry for tenants! If the tramways were owned by the city and if tramway operation were free from its opportunities for appalling wastage of labor and material, the subject of "free transit" would be riper for discussion.

In concluding these references to the matter of housing and transit, the writer extends his thanks to Edmund W. Eyre, treasurer of the city of Dublin, for his courtesy in permitting the inspection of official documents, and of the several classes of houses built by the city.

Aside from its port activities, Dublin is not an industrial city. Its largest establishments are a brewery with 3000 to 4000 employees and a biscuit bakery with 2500 nployees. In both cases, the mass of the workers live the immediate vicinity. The reputation of Dublin a capital and its salubrious climate have, as Mr. owan says, made it the rest house or alms house to hich people broken in health, character or fortune come rom all over Ireland to shelter or hide themselves or to ke advantage of its numerous hospitals and almost innumerable overlapping charities. These factors are not articularly favorable to the highest degree of tramay development, but the Dublin system was the first amway in the United Kingdom to be electrified and it as been progressing ever since. Therefore, an insight to the operating standards will be worth while.

### WHAT THE TRAMWAY SYSTEM IS

The system as a whole, shown in the map on page 039, comprises 101 miles of single track. Practically all outes are double-tracked except 1½ miles of gauntlet interlaced track on certain narrow streets where bound cars have the right of way up to 2.30 p.m. and utbound cars for the remainder of the day. The main reams of travel are north and south, with Nelson's Pillar in the center of the city as the converging point. Of he eight routes that reach the pillar, five are turnbacks nd the others are through lines. The inequality of opulation per acre in Dublin is reflected in this arrangement of routes.

DUBLIN'S CARS AT A MAIN TRAFFIC POINT

With a war-time service of 170 cars, compared with 212 in pre-war days, the company carried 71,008,655 assengers for the year ended Dec. 31, 1918, as comared with 66,624,326 passengers the preceding year. n the basis of 390,000 inhabitants, the journeys per ead of population per annum were thereby increased rom 171 to 182 and the passengers per car-mile from .7 to 10.6. The car-miles run per inhabitant per annum, owever, were reduced from 19.7 to 17.2.

Except for the workmen's cars run out of the depots t 5.30 a.m., the operating hours are from 7.30 a.m. o shortly before midnight, the last cars outbound leavng Nelson's Pillar at 11.15 p.m. In peace days, the last car left at 11.30 p.m. To-day the coal shortage is the determining factor in the hours and the amount of service. At the time of the writer's visit, G. Marshall Harriss, general manager, was absent on a prospecting tour among Irish coal mines.

As indicated on page 1040 there are three peaks on week-days—8.30 to 9.30 a.m., 1 to 2 p.m. and 5.15 to 6 p.m., the last being the heaviest. During these hours the customary headway is two and one-half minutes. A five-minute headway is the normal service, lengthening out to seven and one-half and ten-minute headways at night. The peak hours indicate that life in Dublin is not too strenuous. The shops open at 9 a.m. and close at 6 p.m., and many are closed also during the luncheon period for one to one and one-half hours. Half holidays prevail on Wednesdays and Saturdays, the smaller shops generally observing Wednesday and the larger ones Saturday. During the lively summer travel to the parks and beaches, the pleasure lines are operated on headways down to one minute. Recent betterment of afternoon riding is credited in part to the moving-picture theaters.

While motor cars are permitted a speed of 25 m.p.h., the rather obsolete local regulations specify tramcar speeds of 3 m.p.h. on curves and 7, 12 to 16 m.p.h. from city to open sections. The actual schedule speed is approximately 9 m.p.h., with a maximum speed of 16 m.p.h. on the longer lines. The same schedule speeds are maintained throughout the day. The comparative scarcity of automobiles and the width of Sackville Street, on which the lines converge, serve to prevent congestion troubles. During rush hours as many as 120 cars—all double-deck—are handled per hour at Nelson's Pillar without any difficulty under the control of timekeepers who pass the cars in and out by whistle signals.

In addition to the stops made at the boundaries of fare stages, there are a number of safety stops prescribed partly by the Board of Trade and partly by the company. Otherwise, the spacing between stops is five poles, equivalent to 600 ft. This is the revised distance, about one-third of the original stops having been eliminated as a coal-saving measure. Stops are usually on the near side, but they are governed by traffic conditions rather than by an inflexible rule. Ordinary stops are marked by a pole with a white band; fare stages, by a red plate in addition to the banding.

The Dublin United Tramways handles practically all the traffic of the city. At one time, the little back-to-back carriages known as "jaunting cars" were quite popular, but the high and uncertain fares said to have been charged by the drivers diminished their use. For a short time a bus line was in operation to the steamship piers, largely because it did not pay to put down a 1½-mile railway for one-hour-a-day traffic. After the suspension of this service, four buses were licensed to run between Kingsbridge and North Wall, but as there was a two and one-half minute car service between Kingsbridge and O'Connell Bridge, the buses ran only from the latter point to the North Wall. One of these buses has already been withdrawn. Aside from the traffic conditions, the paving of Dublin is not encouraging to bus operation.

### Detail of Routes—Non-Stop Suburban Cars

The 55.3 miles of route of the Dublin system include the following lines, all shown on the map on page 1039:

*Dalkey Line* (9.1 miles) is a suburban line of residential character but also carries harbor business at Kingstown, the port of Dublin, and in summer transports the working class of people to Merrion Beach. In addition to the usual four-minute headway on this line, the company for about ten years has been running a through or non-stop car service during the rush hours as part of its competition against the Dublin South Eastern Railway. In the morning, three cars leave Dalkey at 8.30, 9 and 9.25 o'clock; in the evening, the times of departure from Nelson's Pillar are 4.16, 5.04, 5.36 and 6.08, the first car out returning in time to make a second trip. These cars make the run in about forty-five minutes, as compared with sixty minutes by the locals. To do this, the local cars must begin to take sidings as near in as Ballsbridge (1½ miles from the city), according to time points and the instructions of the traffic inspectors. At Booterstown it is necessary for the local to switch over to the opposing track. As the result of this competition, the steam road cut its service to a thirty-minute headway, a reduction of 50 per cent. The steam run takes but thirty minutes, but as the electric terminals are more conveniently situated and the headway of the tramway is so short, the advantage of time is usually with the electric service. A diagram on page 1040 shows the afternoon travel on this route.

*Howth Line via Dollymount* (9.5 miles) is Dublin's other suburban line along Dublin Bay. To Dollymount (4.09 miles) there is good traffic, beginning with the business section and extending out into a good residential district. The territory between Howth is largely a campers' district and seaside playground. Through cars to Howth did not pay because they did not start well filled, as the Dalkey ones do. The load curve on page 1040 shows that there is good mid-day travel 4.09 miles out to Dollymount.

*Terenure Line* (3.4 miles) serves a good residential district.

*Dartry Line* (3.15 miles) is similar to the Terenure line, which it overlaps for almost the first 2 miles from the center, making for the encouragement of short riders.

*Palmerston Park Line* (3.23 miles) has good business traffic at one end and residences of good class at the outer end.

*Sandymount Line via Ringsend* (3.25 miles) has a working-class district with a beach at the end.

*Inchicore Line* (3.14 miles) serves a working-class district. The aforementioned brewery and a railway locomotive plant are located along and at the outer end of this line respectively. The load curve between Inchicore and College Green is given on page 1040.

*Ballybough Line* (2.86 miles) serves a working-class district.

*Donnybrook Line to Phoenix Park* (5.06 miles) is a through route on which a four-minute service is given between Nelson's Pillar and Phoenix Park over a single route. On the other side of the city, close to the center, part of the cars are routed via Merrion Square and Baggot Street, and part via Stephens' Green and Leeson Street. Formerly, the cars on both arms went to Donnybrook. Coal shortage, however, made it necessary to cancel the near-by Nelson's Pillar-Clonskeagh line. Consequently, since April, 1918, the Leeson Street arm carries its half of the service via Appian Way and Sandford Road to Clonskeagh. In this way Clonskeagh receives an eight-minute service in place of the former six-minute independent service, and Donnybrook receives an eight-minute service in place of a four-minute service. This reduction produced a big saving in mileage without affecting the Nelson's Pillar-Phoenix Park section, which is a far better traffic producer. The Donnybrook district bears no signs of the famous fair of old, but is a district of substantial residences. Close by in the direction of Clonskeagh there are some poor, dilapidated cottages, most of them being so ancient that they are below the level of the more modern roadways.

*Drumcondra-Rathfarnham Line* (6.2 miles) is a busy through route.

*Dolphin's Barn-Glasnevin Line* (5.12 miles) is a through route. The Dolphin's Barn terminus is in suburban territory, while Glasnevin is a gathering point for farmers on their way to Dublin.

*Fairview-Westland Line* (2 miles) has been canceled because of coal shortage.

*Lansdowne Road Line* (2.5 miles) is a crosstown line to Kenilworth Square. It is now cut off at Castlewood, 1.7 miles being operated at the Landsdowne Road end to keep the suburbanites in proximity to the beach as before.

*Drumcondra-College Green Line* is a circular route which is otherwise served and is now out of use because of the coal shortage.

In addition to the foregoing reductions several other services were canceled during the spring of 1918, but the total amount of single track made idle did not exceed 10 miles. The car-miles for 1918 were 6,787,654 as compared with 7,732,897 for 1917, and although the average number of cars per diem was reduced from 208.6 to 177.6, the daily mileage per car was increased from 100.6 to 103.69 miles. As compared with 1914, the increase in passengers carried was 21.8 per cent besides a reduction in mileage of 12 per cent.

### Single-Truck Cars Prevail in Dublin

The total rolling stock for passenger use in Dublin amounts to 328 cars, but the number in operation has been much below this figure because of coal restrictions. Except on the suburban lines to Dalky and Howth, the single-truck car prevails. The lower deck of these cars seats twenty-five, and the upper deck, thirty-three. An unusual feature is the plush seating on the lower deck. This seating is kept in excellent condition through the use of a vacuum-cleaner car, which visits each carhouse in order. Curtains are also used.

Only fifty of the single-truck cars have top covers, the rest being open because of clearance limitations under bridges, etc. The body doors of all cars are of sliding type, 2 ft. wide in the clear. On the through lines, passengers are permitted to use both front and rear doors at certain places to facilitate traffic. Conductors are ordered to keep the platform clear at all times, and passengers are not allowed to stand inside the cars except when the weather becomes suddenly inclement. "Car Full" signs are hung from the hood directly over the step.

In addition to the roller-type destination sign, every car carries a route-number designation below. A novelty of the painted-board side signs is the use of opposing index fingers at each end to show toward which terminal the car is going—a little thing, perhaps, but one which the stranger appreciates.

The company's double-truck cars are somewhat larger than the single-truck cars, seating thirty-three below and forty-seven above, or eighty as compared to fifty-eight. The principal motor on the double-truck cars is the GE-80, 40-hp. type for a speed of 16 m.p.h., with B-18 and B-49 controllers. Some of these cars are fitted with Westinghouse 220, 40-hp. motors and the same maker's T-IC controllers. All double-truck cars are fitted with the Westinghouse magnetic track brake.

Most of the single-truck cars have GE-52 motors of 27-hp. rating, with B-13 and B-18 controllers. Lately the company has been replacing these equipments with the new GE-200 self-ventilated interpole 40-hp. motor and the same maker's B-49 controller. The work cars have GE-58, 27-hp. motors with B-13 controllers.

### WORKING CONDITIONS—COMPANY-BUILT HOMES

As elsewhere, the war brought large increases in pay to the 700 motormen and conductors of the Dublin United Tramways. New motormen now receive weekly 48s. 6d. ($11.64), of which 23s. is a war bonus. For three-year motormen the corresponding amount is 53s. 6d. ($12.84), of which 22s. 6d. is a war bonus. New conductors now get 45s. ($10.80), and three-year conductors the maximum of 51s. 6d. ($12.36). These rates have probably been increased under the new general agreement of 48 hours' work for 54 hours' pay.

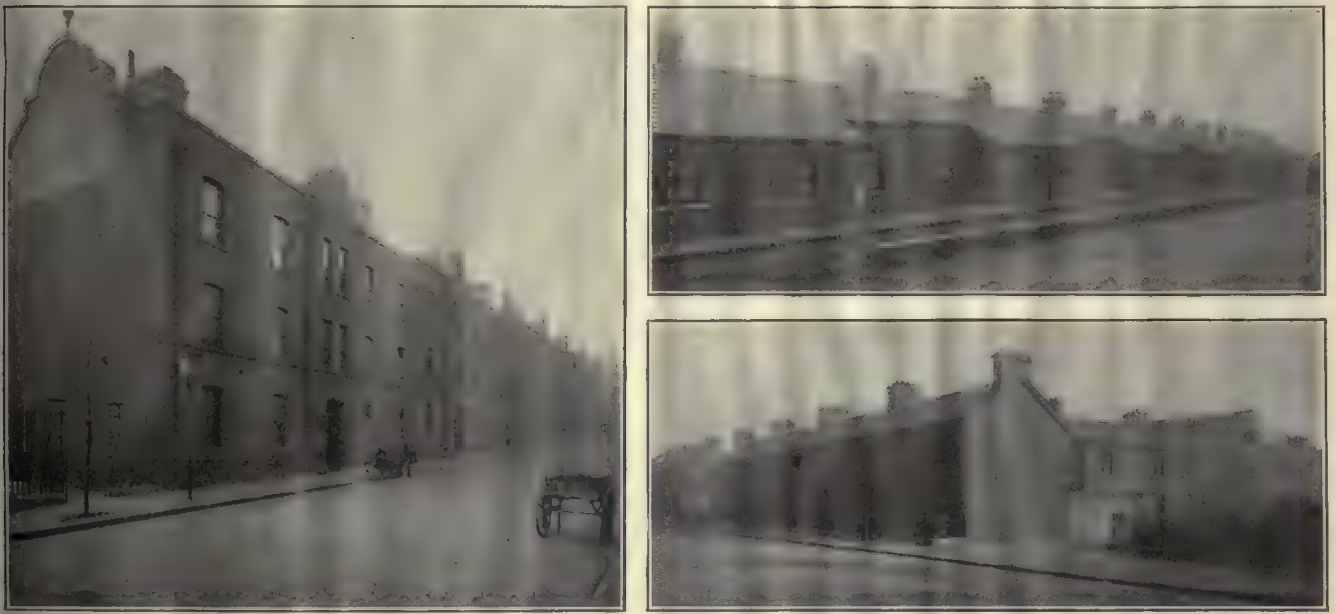
The average workday is nine and one-half hours on week days and eight hours on Sunday, with every twelfth day off with pay. The week averages sixty hours. Uniforms, caps and other operating necessities are supplied free, but 1s. a week is set aside from a man's pay up to £2 as a guarantee against carelessness and loss of uniform. This money is returned to the man whenever he leaves the service.

The employees of the Dublin United Tramways had a mutual welfare society long before the passage of the government acts relating to compulsory insurance. The functions of this society have since been reorganized to meet government requirements where voluntary insurance is maintained. A contribution of 3d. a week brings free medical service, free medicine and 7s. a week to members who fall ill. Free pensions are also provided.

A feature of the time-table practice of the company is that an extra or spare man takes over the regular rotation of runs of the man he temporarily replaces instead of a regular man being advanced from one run to another. Regular men may have a rotation of early, late and split runs, something like this: First week, start 7 a.m., off 12.43 p.m. to 1.43 p.m., and on to 5.30 p.m.; second week, start 12.51 p.m., off at 5.39 p.m., return at 6.50 p.m. and finish at 11.12 p.m.; third week, early morning and late night split or return to first week.

As the first part of this article began with a discussion of the housing problem in Dublin, it is not inappropriate to close it with a few particulars of what the local tramway has done to solve this problem for its own car men. Up to date it has built 220 one-family cottages at locations convenient to the different depots. These houses cost £42,000, and are let at rents of 3s., 4s. and 4s. 6d. weekly. There are 190 one-story houses comprising two rooms, with kitchen and scullery; ten two-story houses comprising three rooms, with kitchen and scullery, and twenty two-story houses comprising four rooms each.

The houses are assigned to the men in the order of seniority and good behavior. They are welcomed by the men not only for their convenience but also for their accessibility. For example, the Cabra carhouse near Phibsborough is located in a good residential section where houses of suitable size and low rental were unobtainable. Here the company erected a complete block of neat brick houses which inclose the street from three sides to make a safe playground for the children. At Donnybrook, where there is plenty of open ground, each tenant has an allotment or war garden opposite his house. From these few notes and the accompanying illustration it will be evident that the company has grappled wisely with its own housing problem. Part II of this article will show the good results of fare increases in 1918 despite enforced reductions in service.



CITY-BUILT HOUSES, BRIDE'S ALLEY, AT LEFT; TRAMWAY BUILT HOUSES, CABRA, AT RIGHT, AND CITY HOUSES OPPOSITE FATHER MATTHEW'S CHURCH, BELOW

These Houses Have Been a Big Factor in Developing the Sacramento-Northern's Freight Traffic

1. National Rice Mills at Sacramento. 2. West Sacramento Bean Warehouse. 3. California State Rice Mill at West Sacramento. 4. West Sacramento Bean Warehouse. 5. Live Oak Warehouse. 6. Esquon Warehouse. 7. Durham Warehouse. 8. Blave Warehouse.

TYPICAL SACRAMENTO BELT LINE FREIGHT TRAIN

# Developing Feeders for Freight Traffic

## Sacramento Northern Railroad Demonstrates from Operating Data the Value of Storage and Industrial Plants in Upbuilding Freight Traffic — Warehouses Have Increased Business Tenfold

THE development of freight traffic on the Sacramento Northern Railroad, particularly with respect to the part played by the warehouse facilities, shows what can be done by intensive effort. This system lies generally north and south in the Sacramento Valley of California and reaches the cities of Sacramento, Woodland, Marysville, Colusa, Oroville, Chico, Suisun and Vacaville, constituting in all approximately 170 miles of main-track line.

TABLE I—GROWTH IN FREIGHT REVENUE

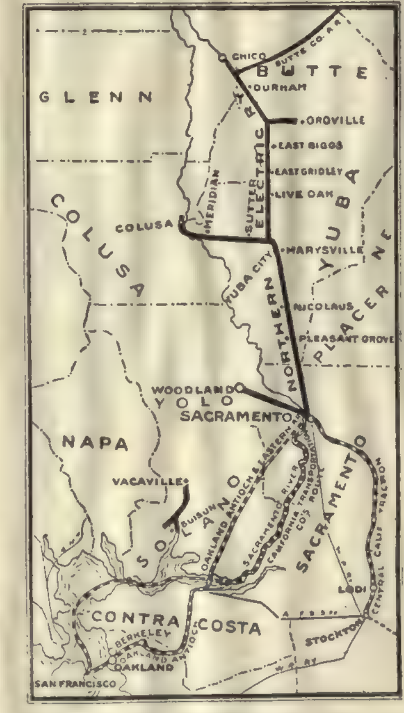
| Year | Freight Revenue, Per Year | Revenue Compared with that for 1914, Per Cent | Ratio of Freight Revenue to Total Passenger and Freight Revenue, Per Cent |
|---|---|---|---|
| 1914 | $260,000 | 100 | 34.8 |
| 1915 | 290,000 | 112 | 39.6 |
| 1916 | 360,000 | 139 | 44 |
| 1917 | 400,000 | 154 | 45.1 |
| 1918 | 556,000 | 214 | 52.2 |

During the past four years more attention has been paid to the development of freight business than previously, with the results listed in Table I. The table shows that during the past calendar year the revenue from freight exceeded that from passenger business for the first time, having increased 114 per cent during the four-year period.

A fair idea of the extent of the freight traffic handled may be gained from the following figures for year 1918:

| | |
|---|---|
| Gross ton-miles | 41,000,000 |
| Foreign freight car-miles | 512,000 |
| System freight car-miles | 920,000 |

From the mileage of foreign cars on these lines, it will be noted that a large amount of the business is interline traffic with the connecting steam and electric lines. This foreign equipment is handled under the M. C. B. interchange rules. Interchange connections are maintained with other carriers as follows:



SACRAMENTO-NORTHERN SYSTEM AND CONNECTIONS

1. At Sacramento with the Southern Pacific Company, the Western Pacific Railway, the Central California Traction Company and the Oakland, Antioch & Eastern Railroad. Of these the first two are steam lines and the others electric lines. Interchange is made also with the California Transportation Company, the Sacramento Transportation Company, and the Producers' Transportation Company, the latter two being river carriers.
2. At Marysville with the Southern Pacific Company, and the Western Pacific Railway.
3. At Oroville with the Western Pacific Railway.
4. At Chico with the Southern Pacific Company.
5. At Fairfield with the Southern Pacific Company.

### LOW-SPEED TYPE LOCOMOTIVES ARE PREFERRED

Table II shows the freight locomotive, power and freight car equipment operated by the company. The smaller locomotives, such as the 1000 to 1005 class, are wooden frame units, equipped with the same type of motors as are used on the interurban passenger equip-

TABLE II—EQUIPMENT OF FREIGHT MOTIVE POWER

| Identification Number | Locomotives | | | One-Hour Rating | | | |
|---|---|---|---|---|---|---|---|
| | Tons on Driver | Continuous Rating T.E. Lb. | Continuous Rating M.p.h. | Amp. | R.p.m. | T.E. Per Amp. | Horsepowe |
| 701 | 21 | 1,880 | 15.2 | 140 | 515 | 19.2 | 160 |
| 1000 | 35 | 2,800 | 25.5 | 300 | 720 | 12.5 | 360 |
| 1002<br>1003<br>1004 | 41 | 2,800 | 25.5 | 300 | 720 | 12.5 | 360 |
| 1005* | 41 | 4,400 | 21.0 | 400 | 720 | 12.5 | 360 |
| 1010* | 77 | 6400 | 24.3 | 620 | 70 | 13.8 | 700 |
| 1020* | 61 | 13,000 | 15.4 | 760 | 470 | 19.6 | 800 |
| 1030* | 60 | 12,000 | 18.0 | 800 | 547 | 17.1 | 800 |
| 1040* | 50 | 9,000 | 13.0 | 460 | 380 | 21.9 | 400 |

* Forced ventilation.

FREIGHT CAR EQUIPMENT

| Number of Cars | Type | Capacity, Lb. |
|---|---|---|
| 109 | Box | 80,000 |
| 141 | Flat | 80,000 |
| 6 | Stock | 80,000 |
| 40 | Ballast | 80,000 |

TABLE III—WAREHOUSES OWNED AND LEASED

| Location | Year Built | Size, Ft. | Type of Construction |
|---|---|---|---|
| Sankey, Live Oak, Esquon | 1916 | 50x200 | Concrete foundation, wooden floor, corrugated iron building. |
| Woodland, Colusa, Shippee | 1918* | 50x200 | Concrete foundation, concrete floor, wooden building. |
| Blava | 1918* | 100x250 | Concrete foundation, concrete floor, corrugated iron building. |
| West Sacramento Warehouse No. 1 and Bean Cleaner | 1917 | 100x400 | Concrete foundation, concrete floor, wooden building. |
| West Sacramento Warehouse No. 2 | 1918 | 100x200 | Concrete foundation, concrete floor, corrugated iron building. |
| Tarke* | 1914 | 50x400 | Concrete foundation, wooden floor, corrugated iron building. |
| Durham | 1918 | 50x200 | Concrete foundation. concrete floor, corrugated iron building. |

* Community concerns promoted by railroad and in which it is part owner only.

ment, except that they are provided with freight gearing. Motors of this particular equipment, however, are of the high-speed type suitable for passenger service, and not suitable for freight service, and the tractive effort necessary for handling the heavy freight trains with these locomotives is obtained only with excessive current, resulting in severe motor maintenance costs and heavy drag on the substations. On account of this fact, more recently locomotives of the low-speed type have been selected, of which locomotives 1020, 1030 and 1040 are typical.

The freight traffic movement consists of two heavy freight trains each day northbound from Sacramento to Chico and Oroville, and two heavy freight trains southbound to Sacramento. These trains approximate 1000 to 1200 trailing tons, and require the services of the larger locomotives. In addition one freight locomotive is kept in regular service on the branch line between Marysville and Colusa, and another on the branch line from Sacramento to Woodland. The small locomotive 701 is employed on the line from Suisun to Vacaville, where freight business exists only a few months of the year when orchard products are being moved.

Two locomotives regularly, and sometimes a third, are required in the Sacramento yards and on the belt line, distributing cars to the various industries. This belt line surrounds the business district of Sacramento on three sides and serves various industries, including the river carriers along the Sacramento River waterfront. The Sacramento yards include about 10 miles of tracks, and from 150 to 200 cars per day are switched in them.

With the California Transportation Company, at the Sacramento River wharfs, are interchanged each day approximately ten full carloads and from one to two cars of l.c.l. business transferred to the boats, and from them approximately 125,000 lb. of l.c.l. merchandise is received for points on this line. A large amount of rice is transferred to the boat company for export. For such switching service locomotive 1040 is particularly well fitted on account of its high tractive effort and low speed.

For the main-line service, however, locomotives of a somewhat higher speed are preferable, suitable locomotives for this service being similar in characteristics to 1020 and 1030. An examination of Table II, and particularly the columns headed "Tractive Effort Per Ampere" and "R. P. M." shows the vital characteristics which are necessary in electric locomotives for handling freight trains; *i.e.*, the most suitable locomotives are those of low-speed design, giving a high tractive effort per ampere, so that the moderate substation capacity of the average electric line can handle the large demands of power made by freight service and still not exceed the capacity of the substation or of the distributing system.

Freight is handled at night after most of the passenger trains are off the line, and one of the operating rules is that all freight trains meeting a passenger train must not start within five minutes after the passenger trains have passed, this rule permitting the line voltage to be held up until the passenger train is accelerated and fairly on its way.

The substations are equipped each with one 400-kw., 600-volt motor-generator set. They are spaced approximately 10 miles apart, and the positive conductor between substations is a 60-lb. third-rail approximately equivalent to 600,000 circ.mil. copper.

A 50-TON SACRAMENTO NORTHERN FREIGHT LOCOMOTIVE

### WHY WAREHOUSES WERE NECESSARY

A large extent of the country tributary to the line is planted to rice, beans and grain, which products must be held in warehouses until sold. The competitive steam lines were well equipped with warehouse facilities, and thus were intrenched in the business of hauling these particular products through the switching facilities on their own tracks. In this competitive territory local capital could not be interested in the construction of additional warehouses on the Sacramento Northern, and in order to obtain a fair share of this traffic it was decided several years ago to construct warehouses at different points on the system. Most of these warehouses were built by the railroad company and are leased to outside warehouse concerns. In some cases the warehouses were community affairs promoted the railroad, which became a stockholder for a cer- in amount of the cost. In other cases the ownership entirely with the railroad. Where the railroad is the le owner in the warehouse the rental charged to the arehouse concern is sufficient in amount to cover fixed arges and upkeep of the property, the benefit to the mpany arising from the additional freight business ceived through new storage facilities and not from y profit in the operation of the warehouse itself.

Table III shows the warehouses recently constructed, gether with sizes and type of construction.

Table IV has been made up to indicate the growth of eight traffic in the items of rice, beans, grains and isins moved in carload lots at various warehouse ints. It permits comparison of the growth in ton- ge and revenue in the year 1918, when warehouse cilities were available, with these items in 1915, when ere were no warehouse facilities. At the nine points ere warehouses have been constructed the increase tonnage is, on the average, 1120 per cent.

### 1000 PER CENT INCREASE IN BUSINESS DONE BY WAREHOUSES

Naturally some of the growth indicated in the upper rtion of Table IV was due to increased acreage. To ve some idea of what this normal growth has been, e figures for Tarke Station are given. At this point warehouse existed both in 1915 and 1918, so that an crease in business at this point would indicate the rmal growth of the traffic uninfluenced by any ad- tional warehouse facilities. In this way the normal owth of tonnage is seen to be approximately 108 per nt, which checks with the increase of 114 per cent in eight business over the entire system, as shown in ble I. In other words, at normal points, the growth traffic in four years has been roughly 100 per cent, hile the introduction of warehouse facilities has in- eased this traffic by more than 1100 per cent.

WAREHOUSE AT SACRAMENTO

All of these warehouses were provided with portable ain stackers, operated by 220-volt, three-phase motors hen this source of power was available, otherwise by 0-volt direct-current motors drawing power from e third-rail.

Obviously the warehouse must be of capacity suf- ient to take care of the tributary acreage. In one in- ance recently a warehouse at one point was not large ough, and business to the extent of upwards of 12,- 0 sacks of beans, 20,000 sacks of barley and 10,000 cks of rice was lost. This was approximately 80 car- ads.

A salient fact in connection with the warehousing grain products is that provision is made in the tariff

TABLE IV—GROWTH OF FREIGHT TRAFFIC IN RICE, BEANS, GRAINS AND RAISINS AT POINTS WHERE RAILROAD HAS WAREHOUSES

| Location | Freight Traffic, Tons 1915 | Freight Traffic, Tons 1918 |
|---|---|---|
| Blava | .... | 956 |
| Colusa | 1,227 | 5,023 |
| Durham | 409 | 8,351 |
| Esquon | 682 | 3,961 |
| Live Oak | 22 | 2,946 |
| Sankey | 675 | 5,540 |
| Shippee | 45 | 2,121 |
| West Sacramento | ... | 8,397 |
| Woodland | 38 | 1,582 |
| | 3,098 | 38,877 |
| Increase in per cent | | 1,120 |

GROWTH AT NON-WAREHOUSE POINTS

| Location | Freight Traffic, Tons 1915 | Freight Traffic, Tons 1918 |
|---|---|---|
| East Nicolaus | 365 | 278 |
| Increase in per cent | .... | 24 |

GROWTH AT POINTS WHERE WAREHOUSE EXISTED BOTH PERIODS

| Location | Freight Traffic, Tons 1915 | Freight Traffic, Tons 1918 |
|---|---|---|
| Tarke | 2,568 | 5,334 |
| Increase in per cent | | 108 |

to take care of the storage in transit, with the same rate applying from the point of origin to the destination as would be in effect with a through haul. In other words, warehouses in the territory where barley is grown may be empty in October and November. During these months rice can be stored, and if the warehouse facilities in the rice territory are not sufficient during these months the rice may be carried to a warehouse in the barley district and there stored until such time as its movement may be completed to the final destination.

The large bean warehouse shown in an illustration is located on the Sacramento River, opposite the City of Sacramento and on the Woodland branch of the railroad. This warehouse was built to attract raw materials from non-competitive points on the Sacramento River and non-competitive rail points to this warehouse. As the warehouse is served exclusively by this road the railroad gets a haul on all outbound business in the finished products, the Sacramento Northern line having both local and joint transcontinental rates with all of connecting steam lines. Thus, the bean-cleaning plant and warehouse creates a market for products from non-competitive territory and brings this material to this company's rails so that outbound it may move over its line.

PASSENGER STATION AT LIVE OAK

Adjacent to this bean-cleaning plant and warehouse there have recently been constructed two large rice mills, one by the National Rice Mills, in which local capital is interested, and the other by the California State Rice Milling Company, the parent company of which is the Louisiana State Rice Milling Company. This latter rice mill is now the largest west of New Orleans and this year will become the largest rice mill in the United States. These plants at West Sacramento have had the effect of stopping at Sacramento a large amount of tonnage which would have gone to San Francisco, thus giving an opportunity to profit by the growth of acreage in territory not naturally tributary to this system, and in addition to the outbound haul which is obtained on the finished produce the City of Sacramento obtains the benefit of the large payrolls of these plants.

By way of summary it may be said that the experience of the Sacramento Northern Railroad in building up a substantial freight service and revenue has shown the following results:

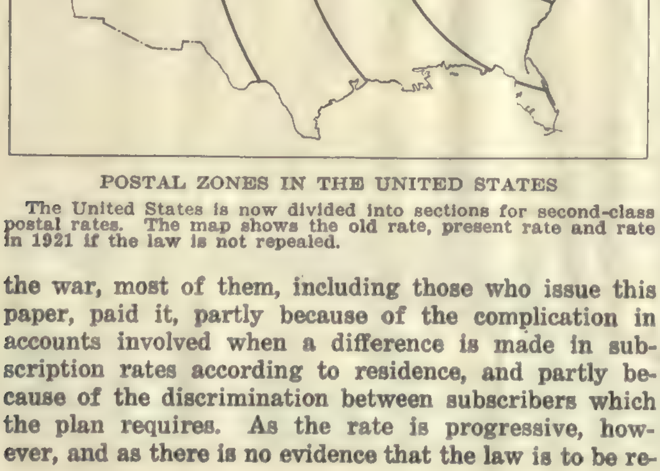
1. Added service was given to the community served by the provision of warehouses, terminals, etc., and cooperation with desirable industries.
2. Steam-road competition was met by the quality and frequency of freight service.
3. Motor-truck competitive haulage was reduced to a minimum by superior and cheaper service.
4. Gross revenue was greatly increased through the upbuilding of a profitable freight account.
5. Existing investment in track and power houses was used for freight business.

## Where Do You Live?

### Zone Postal Law Compels a Higher Subscription Rate West of the Mississippi River

AT THE TIME that the zone system for second-class postage was under consideration by Congress two years ago, this paper protested against the unscientific nature of the proposed rates which exaggerated the effect of length of haul on postal charges and ignored the terminal expense. The evils from a national standpoint of basing a charge for postage on distance and thus sectionalizing the country in the distribution of intelligence were also pointed out. At that time a number of readers of this paper who would be most affected by the measure wrote to their representatives in Congress protesting against the change. Other opposition developed, but the bill was finally made part of the war revenue bill and was passed.

As publishers generally did not believe that the retention of this tax would be seriously considered after the war, most of them, including those who issue this paper, paid it, partly because of the complication in accounts involved when a difference is made in subscription rates according to residence, and partly because of the discrimination between subscribers which the plan requires. As the rate is progressive, however, and as there is no evidence that the law is to be repealed the publishers of this paper feel forced to recognize the facts in their subscription rate. They do not plan at present to go farther than to establish two zones, the dividing line being the Mississippi River. Hence, beginning July 1, subscribers to the ELECTRIC RAILWAY JOURNAL who live west of the Mississippi River must add 50 cents a year when they send their subscriptions, and if the zone law is not repealed, it may be necessary later to readjust these differential rates. The accompanying map shows the postal zones into which the country is divided by the law, the postage annually per subscription under the old rate, that in 1919 and that in 1921.


ZONE VIII
ZONE VII
ZONE VI
ZONE V
ZONE IV
ZONE III
ZONES I & II
Rate under Old Law $0.40 $0.40 $0.40 $0.40 $0.40 $0.40 $0.40
In the Year 1919 $1.56 $1.44 $1.20 $1.08 $0.96 $0.72 $0.60
In the Year 1921 $2.64 $2.40 $1.92 $1.68 $1.44 $0.96 $0.72

POSTAL ZONES IN THE UNITED STATES

The United States is now divided into sections for second-class postal rates. The map shows the old rate, present rate and rate in 1921 if the law is not repealed.

It will readily be seen, from the rapidly progressive charge per zone, that the result of such a system of postal charges will seriously penalize the spread of intelligence in this country, particularly to those farthest from the large industrial centers. It will be surprising if those who are thus obliged to pay these higher rates do not complain to their congressmen about the continuance of any postal system which disregards the cost of transportation as absolutely as does the present zone postal law for second-class matter.

## Engineering Association Assigns Subjects

THE American Railway Engineering Association has assigned a number of new subjects for committee work. Among those of interest to electric railway men are the following: Use of reinforced-concrete slabs, etc., to assist the ballast in distributing the load on soft roadbeds. Effect of usage on the physical properties of rail steel. Effect of distribution of loads through ballast and embankment as affecting the design of masonry structures. Study of methods of conveying and depositing concrete. Study of the availability and use of sodium chloride as a preservative for ties, and of the comparative value of several grades of creosote oil and creosote coal tar solutions as preservative agencies. Further collection of data relative to clearances of third-rail and overhead working conditions. Co-operation with the Bureau of Standards in regard to the National Electrical Safety Code and other safety codes, and preparation of specifications for insulated wire and cables. Study of methods for training and educating engineering and maintenance department employees.

## Franchise Calls for Value, Not Coin

L. A. HERDT, D.S.C., vice-chairman Montreal Tramways Commission, gave a very clear presentation of the electric railway situation in an address before the Montreal Publicity Association on May 9. He brought out very clearly the present situation on fares when he said:

"The fares should be restored to the level which prevailed in past years. In Montreal the ticket dropped in our fare boxes to-day bears the impress '5 cents' but as compared with the 5 cents of a few years ago, it is 2½ cents and no more. The street railway franchise, or the statute of agreement calling for the 5-cent unit, calls not for an impress or a coin but for a certain value of purchasing power. The equivalent of the 5-cent coin in the decade 1890 to 1900 in purchasing power is the 10-cent fare. The purchasing power of the dollar has declined at least 50 per cent since the early nineties."

# Plain Words on Transportation Service*

## Concrete Suggestions Are Made on Ways in Which the Service Can Be Improved in Schedule Making, Lay-Overs, Traffic Supervision, Assignment of Runs and Other Ways

BY ALEXANDER JACKSON
Superintendent of Time-tables, Public Service Railway,
Newark, N. J.

THE time-tables of an electric railway property are the cornerstone upon which the financial structure is built, and a great loss can be incurred by carelessness in their construction and operation. A time-table to meet traffic conditions should be developed with great care after a comprehensive study has been made of the district to be served, and sufficient cars should be placed in service to accommodate all persons presenting themselves for transportation. After the schedule has been inaugurated it should be carefully checked at frequent intervals to see that it is giving the results desired.

### THREE FACTORS TO BE CONSIDERED IN DEVISING SCHEDULES

In providing the public with safe, convenient and adequate service, and in the development of time-tables to that end, there are three governing factors which must be taken into consideration if satisfactory results are to be obtained.

First, the public should be furnished with dependable service, given by means of clean, well-lighted and well-ventilated cars suitably heated during the winter months. These cars should be in charge of courteous, careful trainmen, including conductors who among their other duties will call out the streets and transfer points distinctly so that strangers will not be carried past their destinations.

The trainmen, through proper division of the car-hours comprising the proposed schedule, should be given a day's work to be completed within a reasonable time and with an over-all spread as short as possible.

The company, comprising the many holders of securities, should receive a reasonable return upon the investment made in the property. The extent to which this can be accomplished depends upon the furnishing of such service as will attract business and as can be furnished at a minimum of expense.

Satisfactory service to the public involves regular operation in accordance with the time-table, the cars leaving the terminals on schedule time and being kept on time so that headways will be equalized. The service must be adjusted to the needs of the line but it should be remembered that constant changing of schedules does not always improve conditions. It tends to keep the men in an upset condition, always anxious to know when a change is to be made and how it is going to affect them personally. This is perfectly natural as it may happen that a man holding a day run on one schedule may draw a half night run when a change is made, thus necessitating a change in his entire mode of living.

A division superintendent, before making recommendations to the general superintendent as to changes in time-tables, should be thoroughly familiar with conditions existing on the several lines of his division so that when a supervisor makes a request for additional service the superintendent can decide wisely in justifying or refusing the change. He should pass on no alterations in the time-table without having made personal observations of the service. The same principle applies in connection with applications for additional running time or lay-over time.

The division superintendent needs first-hand information to enable him to check the laying out of time points. He should not deal in generalities, but should depend upon facts which he can personally verify. He should know if apparent trouble is caused by one or two trainmen on a line who continually run late, or whether most of the cars run late. It may be that the trouble is caused by vehicular interference or by delays in interchange of passengers at heavy loading points. When time cannot be made, specific reasons should be assigned for the trouble.

The superintendent should try to avoid making a request for one or more additional cars to be used to increase lay-over or running time. If he owned the road himself he certainly would use every effort to save a car. He would not spend $12,000, a year for an extra car if the money came out of his own pocket. In the last analysis the company's interests are his own.

There is no other industry in which, after a man has worked a period of time equivalent to a trip on a trolley car, he is allowed 5 or 10 per cent of the working time to rest. How often is a trainman overheard to say: "The time on this line is too fast, and only two minutes are allowed in lay-over; we have to work every minute and it is a case of getting to the end of the line and right back again"? This is as it should be.

Some of the time allowed in lay-over is for slack in the time-table, so that in case of delay on any trip the car can leave for the next trip on time. Most of the lay-over time is due to the fact that the running time for the round trip is not evenly divisible by the headway, the remainder in many cases being the only time allowed for standing. If cars could be operated without delays and if the running time were divisible into even minutes in all cases lay-over time would not be necessary.

The time has arrived when electric railways cannot afford to pay for lost time. If on the 14,274 trips operated per day on the Public Service Railway we allow an average of only two minutes lay-over on each trip, there results a total of 476 car-hours per day. The corresponding annual cost in platform wages approaches $150,000.

The division superintendent should be on the lookout for signs of congestion at any point and be ready to work out plans of relief. Congestion spreads very rapidly, and soon leads to saturation and stagnation. Motionless cars cannot increase a company's income.

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*Abstract of paper read at meeting of Public Service Railway Company section, American Electric Railway Association, Newark, N. J., May 23, 1919.

Again, he can be prompt in making thorough investigations of complaints from the public regarding service. A prompt removal of the cause of criticism will be to the advantage of all concerned. Furthermore, on the occurrence of accidents, derailments or serious delays on any line the division superintendent should inaugurate investigation immediately. He should make it his business to visit the carhouses on his division frequently and to keep in close touch with the station force and trainmen. Cordial greetings to the men will do much to show them that the superintendent and the company have their welfare at heart.

Superintendents should also ride much in the cars on their lines, and not travel too exclusively by automobile when they have the opportunity to do so. The automobile is to be used when such use will conduce most to the benefit of the company, but the best place to secure first-hand information regarding equipment, tracks, paving, overhead and service in general is on the cars.

### EFFICIENT SUPERVISION IS A PRIME NECESSITY IN TRANSPORTATION

The supervisor who is on the job knows that equalized headways mean good business. The earning capacity of a line depends to a considerable extent upon the regularity with which headway between cars is maintained. Broken headways, with cars running in bunches, drive business away and irritate the passengers who are forced to patronize the service. Irritation on the part of passengers makes the work of the trainmen more difficult and strains relations with the public.

When bunching of cars occurs the supervisor must find out the cause of the irregularity and determine why proper headway cannot be maintained. As his title indicates he is supposed to oversee the operation of the cars assigned to his lines.

It is the supervisor's duty also to see that the cars are kept clean, because he is furnished with the necessary help for this purpose. Conditions of uncleanliness would not exist if the supervisors conducted periodical campaigns on car cleaning.

The supervisor also should be very careful in picking men for advancement in his department. Men should be picked on the basis of their efficiency; for character, ability and personality. In this department a man who can mix well with his fellow-workers and can smooth out troubles is greatly to be desired. Men who keep things "riled up" should never be selected for work in this department. It is a poor philosophy also for the supervisor to be afraid to pick a good man for fear that the latter may eventually oust the supervisor from his job. If a man, in this as well as in any other department, expects advancement himself, he should always have someone prepared to "step into his shoes."

### WHERE THE STATION MASTER COMES IN

The first duty of the station master is to see that cars pull out of the carhouse on schedule time in starting the day's work. When crews leave a minute or two late they are making a bad start for the day's run. Furthermore, this induces a tendency on the part of motormen to run their cars recklessly trying to make up for the lost time. It is impossible for a company to have careful trainmen and careless station masters.

The station master also should assure himself that his cars are clean and in proper condition to be placed in service. Very often public opinion is greatly influenced in regard to service by the appearance of equipment.

It is a good practice for the station master to glance out through his office window now and then to see how headway is being maintained on his lines. This will give him first-hand information.

Among the many little duties to which the station master should give attention are such as these: He should make an inspection of the carhouse and yard after the car cleaners are through to see in what condition they have left the premises. He should see that all trolley poles have been removed from the overhead wire and are securely fastened down. He should insist on the cutting out of all unnecessary lights around the carhouses and yards. He should insist on care in seeing that bolts, nuts, washers, and trolley wheels are not scattered around the yard but are collected and deposited in their proper places. He should keep a sharp lookout for stray oily waste, journal box packing and litter generally, with his mind fixed on the possibility of fire. He should assist in conserving stationery and other materials.

Finally, the relations of the station master with his men are very important. He should give them a square deal, especially in assigning extra men from the list to the board. A favor done a man one day may be returned later when, for example, the station master wishes to have a man take out an extra trip after completing his day's work.

### REPORTS NEED PROPER INSPECTION

Regarding clerks and receivers, it is well known that the carhouse employees of these classes are continually busy attending to their regular duties. It is, however, just as easy for them to do their work well as to turn in illegible, "sloppy" and inadequate records. Clerks should not accept conductors' day cards unless these are properly and completely made out, and the same is true with regard to accident reports.

These remarks apply on the Public Service Railway particularly to form No. 418, a very important one, as it is the basis for all car-mileage and carhouse data. This form calls for the schedule number, the number of cars run, the number of trips, the car-hours and the car-miles. The necessity for care in the filling in of this form is an obvious one.

When the cars are all out on the line it falls to the inspector to be responsible for their movement. He is the man who must actually check the headway and turn in reports as to bunching and the reasons for this difficulty.

The inspector has an excellent opportunity to explain to motormen who are running ahead of time how serious is the effect of this practice in producing unequal distribution of passenger transportation. He can explain how the motorman is not doing his share of the work in passing up some of his business to his follower, who is running on time and having his car overcrowded because the leader is running away.

The inspector should frequently compare watches with the trainmen to insure their knowing that they are ping to schedules. He can also study the manner which the motormen are operating their cars, with erence to feeding the controller, applying the brakes, ucing speed over special work and curves, etc. And regard to coasting, the supervisor has an opportunity assist in the saving of energy. Some motormen have very bad habit of running by passengers. The in- ctor should detect this practice and secure the dis- ssal of men who cannot overcome the habit, which not fair to the passengers or the company. It is not r, either, to run away from an approaching car at transfer point, especially when the lines are on a g headway. The company is selling transportation it is the inspector's duty to help develop trade and discourage it.

The inspector should see also that all crews are fa- liar with the running time points on the line and that ey are striving to adhere strictly to them. After a day on the line he can do much to straighten out the s rather than leave it to the trainmen to get back schedule time the best they can. In all of this work eat tact is necessary, for it is humiliating to a man be corrected before his associates.

The inspector should also keep his eye on the equip- nt on the line and see that it is up to standard. Cars ould not be allowed to be operated with dilapidated or ssing signs, broken windows, etc. He should also ep in close touch with traffic conditions on the line d make it his business to learn when churches, lodges d other organizations in his district are to have spe- l gatherings that will overtax the cars. A notifica- n to the supervisor will insure proper service, and is such emergency service that wins friends for the mpany. During the summer he can canvass his dis- ict to learn when there is to be extra riding due to cursions or picnics.

In the foregoing attention has been called to some ints regarding which strict observance will make the ployee's work easier and more effective to himself d his superiors. "If a job is worth doing at all it is rth doing well." The electric railway industry is orking at present under most trying conditions and ust expect the utmost from every employee regardless his rank. If the business is to continue each indi- dual must work with his maximum effectiveness.

## Utilizing the Transformer Pumps for Emergency Duty

N THE Canal Substation of the Columbus Railway, Power & Light Company, Columbus, Ohio, recently mpleted by the E. W. Clark Engineering Corpora- on, the circulating pumps used for the transformer oling water also perform other functions. In addi- on to circulating this water through the cooling tower, e piping is so arranged that either pump can be sed to pump out the transformer pit or the substation asement in time of flood when the ordinary sewer nnections have to be closed. The basement is rather eep, due to provision being made for installing feeder egulators on the outgoing circuits at a later date if ecessary. The substation site is well above extreme igh-water level but both the basement and the trans- ormer pit are below this level, so that the sewer con- ections from them are provided with valves and the bove provisions are made for pumping them out in ase of flood.

## 1918 Steam Line Statistics

### Under Government Control Net Operating Income of Class I Carriers Fell Off $214,000,000 or 23 Per Cent

THE operating revenues in 1918 of 195 steam railroads of Class I (having annual revenues of more than $1,000,000) amounted to $4,913,319,604, an increase of $862,856,025 or 21.3 per cent over 1917. Freight revenue rose 21.7 per cent and passenger revenue 24.7 per cent. These figures are contained in the latest report of the Bureau of Railway Economics, based on returns to the Interstate Commerce Commission.

The operating expenses of these carriers aggregated $4,006,894,762, an increase of $1,148,682,552 or 40.2 per cent. Maintenance of way expenditures increased 46.7 per cent, maintenance of equipment 60.4 per cent and transportation 33.7 per cent. The operating ratio was 81.55 per cent in 1918 as compared to 70.57 per cent in 1917. Taxes at $186,652,095 represented an advance of 2.1 per cent, and the net operating income at $690,418,778, a decrease of $284,360,159 or 29.2 per cent.

The net operating income for 1917 was greater by about $70,000,000 than the annual average of the three years ended June 30, 1917, the test period which formed the basis of the standard return guaranteed by the railroad control act of March 21, 1917. Accordingly, the point of greatest interest in connection with the net income earned in 1918 is not the $284,000,000 by which it fell below that for 1917, but the approximate difference of $214,000,000 between the $690,000,000 actually earned by railroads of Class I under government operation during 1918 and the $904,000,000 which they earned annually during the test period.

The following table compares the returns of 1918 with the average annual results of the three-year test period:

| Item | 1918 | Test Period, Average 1915–1917 | Change in Per Cent |
|---|---|---|---|
| Operating revenues | $4,913,000,000 | $3,391,000,000 | Inc. 44.9 |
| Operating expenses | 4,007,000,000 | 2,293,000,000 | Inc. 74.7 |
| Net operating revenue | 906,000,000 | 1,098,000,000 | Dec. 17.4 |
| Taxes | 187,000,000 | 152,000,000 | Inc. 22.6 |
| Net operating income | 690,000,000 | 904,000,000 | Dec. 23.7 |
| Operating ratio—per cent | 81.6 | 67 6 | Inc. 20.7 |

It should be noted in connection with the operating expenses of 1918 that the aggregate shown in the next table ($4,007,000,000) does not include the cost of maintaining the corporate organizations of the railroads. This cost represents a substantial sum, the exact amount of which is not yet available. Corporate expenses were a part of the operating expenses of 1917 and of the test period. For an exact comparison, the corporate expenses should be added to the operating expenses of 1918, which would correspondingly swell the increase over 1917 and over the test period.

According to a note in the *Electrical Review*, London, the president of the Hungarian State Railways has submitted a proposal to the Minister of Commerce urging that immediate steps be taken for the electrification of the Budapest Railways. It is estimated that by the electrification of about 1350 miles of line 1,500,000 tons of coal would be saved annually.

# Side Lights on the Zone Fare—The Bane of Comparative Statistics

### The Greater Track-Miles in the United States Cannot Explain Away the Fact That British People Are Better Riders of "Walking" Distances

BY WALTER JACKSON

THE many misconceptions that have prevailed in this country concerning the British system of graduated fares seem to be due to two causes: Hearsay and the thoughtless repetition of hearsay; comparisons of street railway statistics made by those who were unfamiliar with conditions in detail in both the British and the American cities compared. It is a pity that so many should have decried for so long the principle of charging by distance because some of these folk will now have to reverse themselves. For example: After all the gratuitous assertions that zone fares are responsible for British congestion we are now gravely assured by a former universalist that "the typical American city has a highly congested center, etc.," and not the zone-fare British city. Precisely! But why didn't we make this discovery sooner?

Hearsay has many sins to answer for, but the "comparative statistics" fellow is worse. He takes a peculiar delight in comparing such figures as track-miles, passengers per track-mile and passengers per car-mile, and has no difficulty in proving what is true: That the American rider is offered too much for his money. It does not occur to him to go to the sources, namely, the cities themselves, to see what the pretty figures really mean. "Fine words butter no parsnips" and duplicate track pays no dividends.

To avoid burdening the reader with figures, let the dread truth be admitted without parley: British cities do have less miles of track per population than American cities. In fact, one may say that we generally have too much and the other chap too little track. Why is this? Primarily, the lesser amount of trackage of British tramways is not due to any unwillingness by the operators to develop facilities or by the public to move out into the country. In part it is the result of legislation since 1870 which makes it necessary for a municipal or private operator to go through cumbersome Parliamentary procedure for the right to extend trackage; in part, it is the result of a more unified development in which every piece of track is made to count.

Whereas British tramway development was greatly hampered, especially in planning suburban extensions into other political subdivisions, American builders were free to risk as much as they liked. In their optimism, they built too far out into the country, often transforming the 2-mile rider into a 4- or 5-miler, but without getting any more money for the doubled service. But even in the older parts of the cities the old competitive lines built more track than was really needed. Unfortunately the investment involved blinded the owners to the desirability of wiping out needless lines after consolidation.

Instead of bewailing the taking up of unprofitable track we ought to be thankful that the true commercial spirit is entering the industry. It is cheaper to pay fixed charges on the bonds of an obliterated road than to pay operating deficits, too. At least that has been the standpoint of British municipal tramway managers for years. Is it not worth a thought that even these compact properties will not tolerate the retention of useless trackage?

The true test with regard to track mileage is whether there is enough of it to serve the needs of the community. If there is, nothing will be gained by comparing it with another city of like size, because no two towns are similar in topography, distribution of industries, etc. While most of the British tramways lately visited by the writer were contemplating either track or omnibus extensions, none except the Edinburgh electrification from cable traction felt that they would need to build any important extensions at the termination of the war period. Of the other roads, the Glasgow Corporation Tramways apparently has the most ambitious plans, in figuring to go from 196 to 238 miles of single track.

Rides per inhabitant per annum offer a second dangerous means of comparison unless used with care. This per capita figure is not merely a function of trackage, cars, fares and other street railway indices. The degree of concentration of the inhabitants with regard to places of work and pleasure is extremely important—yet the effect of this cannot be estimated except by a population survey. To illustrate: In Edinburgh a great part of the population lives in tall tenements. The older folk and children on the upper floors of such houses are virtually prisoners, while many of the active workers are within walking distance of their jobs. Contrariwise, a city in a river valley, like Glasgow, has the right foundation for high per capita riding.

Nor should we forget in connection with these studies that hitherto many British workmen have had such long hours that they have tried to live close to their work. With shortened working hours they will be more willing to move out into more distant sections and so become car riders.

In a recent quasi-technical paper passengers per car-mile were used as an index of service. The reader was allowed to infer that the more customers a street railway car gets the more censure the company deserves! That there are but six passengers per car-mile in the American city praised and eighteen in Glasgow is no severe reflection on Glasgow, when a person familiar with both cities knows that most of the difference is due to the better load factor built up in Glasgow by short-ride traffic. Overcrowding during the rush hours is not inconsistent with a low passenger per car-mile index, for the American passenger averages a longer occupancy of the seat. For example: Sixteen passengers per car-mile where each passenger averages 2 miles means no more seats used than eight passengers averaging 4 miles each. In each case the passenger-miles, a unit unknown to the universal fare, are the same, 32. The higher figures of Britain do not mean that the cars are overcrowded. Riders going 1½ miles or less are not likely to board a car that is uncomfortably full. As these riders constitute one-half the traffic and are the patrons who can walk, the answer as to service standards is obvious.

After all, what have we to gain by comparisons that do not put customers in empty seats? It is up to each operator to find whether he can create on his own system by either the zone system or frequent service or both that great percentage of short-ride traffic which is an inevitable characteristic of British travel, whether the cities are large or small, congested or diffused, industrial or residential.

A FAMILIAR PIECE OF SKY LINE ON THE JERSEY COAST

# N. E. L. A. Meets at Atlantic City

### The Subjects Discussed at the General Sessions Included Municipal Ownership, Conservation of Power Resources and Lamp Production—The Technical Sessions Took Up the Questions of Prime Movers, Oil Switches, Underground Construction and Overhead Lines

AN "OLD TIME" convention was held by the National Electric Light Association at Atlantic City last week. In 1918, only about 300 were present and they met in a hall of one of the hotels. This year "The Million Dollar Pier" was engaged, meetings were resumed by all of the different sections, the attendance was large and there were about 200 exhibits. It was called a "victory" convention, and all in attendance seemed pleased to be back on a peace footing again.

#### FOUR GENERAL SESSIONS WERE HELD

Four general or executive sessions were held on the three days of the meeting. In addition meetings were held of the technical, commercial, vehicle and accounting sections.

In his presidential address at the first general session, Mr. Wells referred to the sweeping change between the conditions of last year and those of this year. He then discussed the rising costs of operation and of raising capital and expressed the opinion that the uncertainty of the future makes a short-term note at high interest rates probably the most favorable competitor at present of tax-free investments.

In the report of the rate research committee, Alexander Dow referred to the general practice of commissions of allowing surcharges rather than increases in the basic rate, evidently with the belief that the present price conditions were only temporary; but he pointed out that these conditions remain and that the period of readjustment which the country is now undergoing is not likely to be a period of retrogression in costs.

The report of the public policy committee was presented at the second general session on Tuesday evening. W. W. Freeman, chairman of the committee, in speaking of municipal ownership, called attention to the difference between the man who advocates municipal ownership as a question of economics and one who advocates it because he believes in socialization of the country. The former can be reached by arguments and a showing of facts. The latter will continue to advocate socialization irrespective of any financial considerations. The spread of socialism and municipal ownership is being urged by an active propaganda, said Mr. Freeman. The problem of a counter propaganda has been considered by the committee, but it was not prepared to outline any specific plan of action.

At the third general session George Otis Smith, director of the United States Geological Survey, described the ideas underlying the proposal of Secretary of the Interior Lane for an investigation of the power resources in the entire country and in the Atlantic Seaboard District. He also called attention to the difference in manpower required by a steam plant and a hydroelectric plant and cited the case of the Alabama Power Company where the ratio was 84 : 1. It is time, he thought, to count the rising costs of labor in the steam plant, where the coal miner as well as the fireman is an employee in fact. From the proposed power system of the so-called Boston-Washington District would flow the energy to serve a score of railroads, hundreds of public service companies, thousands of manufacturing plants and millions of homes.

The report of the lamp committee, presented at the fourth general session, showed the total sales of incandescent lamps for domestic purposes, excluding miniatures, during 1918, to be 186,000,000; of this number nearly 90 per cent were tungsten filament lamps and the rest were carbon and "gem." The production of gem lamps has now been discontinued. The use of carbon lamps seems still to be confined to places where service is severe, where the use is temporary or where protection from theft cannot be afforded.

At the conclusion of the meeting the following officers were elected for the ensuing year: President, R. H. Ballard, Southern California Edison Company; first vice-president, Martin J. Insull, Middle West Utilities Com-

pany; second vice-president, M. R. Bump, H. L. Doherty Company; third vice-president, Frank W. Smith, United Electric Light & Power Company, New York; fourth vice-president, Walter H. Johnson, Philadelphia Electric Company; treasurer, H. C. Abell, American Light & Traction Company.

### THE DISCUSSION ON PRIME MOVERS

The principal feature of the technical meetings of electric railway interest was the report of the committee on prime movers, of which an abstract was published in the last issue of this paper.

In the discussion, W. L. Abbott, Chicago, pointed out that although there had been considerable concern regarding the operation of large turbines, there is nothing in the situation that warrants distrust in large turbine units or in the present design of these machines. W. S. Finlay, Jr., Interborough Rapid Transit Company, New York, commented on the operation of the large turbines of that company. He said that the generating system of the company is now laid out on the basis of a 30,000-kw. unit, and operating conditions and connections are such that a 15,000-kw. unit is floated on the lines and available at all times, so that a 30,000-kw. unit can be taken out at any time without a disturbance in plant operation.

On the subject of boiler operation a number of speakers seemed to agree that higher pressures must come at an early date, 500 to 600 lb. being mentioned by several. One speaker, in commenting on the subject of superheaters, said that the superheater is a good indicator of the condition of the boiler. In case the boiler throws over solid material, the trouble should be corrected at its source.

In connection with the section on stokers and grates, one speaker mentioned interesting results secured by means of water backs which had been installed to help out in troubles with clinker grinders and to utilize heat for raising the temperature of feed water. He said that with long water backs, from 4 to 5 per cent of the heat generated in the furnace was absorbed by the water passing through the water backs, while with short water backs this rate of heat transmission was reduced approximately 60 per cent. Progress was mentioned by several speakers in the burning of powdered fuel.

### ELECTRICAL APPARATUS REPORT

The discussion on this report, of which an abstract was published on page 1003 of last week's issue, centered around standardization of transformer polarity, construction of substations which can be easily enlarged, automatic substations, difficulties with oil and airbreak switches, basis for oil-switch guarantees, and protection of generators against internal troubles. Owing to the difference of opinion which developed at the meeting regarding the advisability of standardizing transformer polarity, the subject was referred back to the sub-committee for further consideration. According to several speakers, too many outdoor substations are constructed so that they cannot be easily extended. Another referred to the use of automatic substations for serving three-wire loads as a means of saving investment in large feeders. One central station operator suggested that oil switch explosions were sometimes due to explosion of oil fumes, in which case they may be prevented by proper scavenging of the air, one method being described. This involved the use of two large check valves, one at oil level and one at the top of the case to permit air circulation. The subject of extinguishing fires in generators was a lively one, the use of steam or water or both being advocated for this purpose, although preference was shown for water. It was said that the immersion of armature coils in water if not prolonged is not permanently injurious, but they should be dried as soon as possible.

### CONDUITS AND CONSTRUCTION OF UNDERGROUND FEEDERS

Underground construction was discussed under fourteen headings in the report of the committee of which B. D. Meyer is chairman. Three topics which were treated most extensively were, carrying capacity of cables, dielectric losses and cable failure. According to the committee, the rating of a cable should depend on the temperature actually obtained during operation. To facilitate determining this rating, operating companies are urged to keep accurate records on the loads on their transmission cables as well as measurements of temperature and data on characteristics of the duct line. The Public Service Electric Company has developed a plan by which the cable is given a seasonal rating based on the average temperature of an idle duct. Another company reports that the temperature of a bad local hot spot in the duct line was reduced from about 160 deg. Fahr. to about 75 deg. by uncovering the conduit line for a distance of about 20 ft. and back filling the excavation with heavy clay to replace the sandy fill which had been causing the trouble. Where local conditions do not permit the use of this method, a specially ventilated manhole may be installed at the point where the temperature is excessive.

Considerable space was given in the report to a discussion of the relative values of rosin and mineral-oil compounds for feeder insulation. The mineral-oil compounds seem superior to the rosin oil base as far as dielectric losses are concerned, but the committee suggests that some mineral-oil compounds might become too fluid at high temperatures, leaving the insulating material dry at certain sections and thereby liable to breakdown. Additional investigations will be undertaken by the committee.

The committee reports cement as being superior to the various types of asbestos covering used for fireproofing cables in manholes. However, there is a considerable difference of opinion regarding the comparative merits of rope and metal lath for reinforcing the cement covering. It is generally agreed that the covered cable in the manhole has a better chance to radiate its heat than the covered cable in a conduit line.

The opinion was expressed that it is not desirable to concentrate more than 7000 kva. to 8000 kva. in a single underground circuit, and that 3-in. (outside diameter) cable is about the largest now in use. The committee recommended that the size of a single conduit be limited to from sixteen to twenty ducts and repeated a previous recommendation that not more than 35,000 kva. be carried in a single duct line.

In discussing the committee report, the members agreed that great advantages would result from further standardization of manhole and duct line construction. Several members felt that the standard duct size might well be 4 in. or 4½ in. instead of 3½ in. This would facilitate changes and repairs. Considerable difference of opinion was expressed regarding the relative methods of protecting cables in manholes with cement (over metal lath or rope) and disposing them on shelves. One speaker advocated more uniform spacing of manholes in the interest of reducing the number of cable lengths which must be kept on hand.

### REPORT ON OVERHEAD LINES

The committee on this subject referred to the studies conducted by the California joint committee. Reference was made also to the joint use of poles by power and telephone companies as of much concern to the industry and public. Thus far, it was said, prevailing telephone practice had definitely discouraged extensive joint pole use, it being limited to circuits not exceeding 5000 volts, no suitable provision being made for the higher voltages which are required in the development of power company business.

One war-time suggestion made by manufacturers was a new standard for cable stranding, based upon utilizing a minimum number of strand sizes and designating each cable in terms of the number and diameter of strands composing it, rather than in terms of circular mils, as at present. This would reduce stocks and make for more prompt deliveries.

Further study of the causes for insulator depreciation was urged.

## California Electric Railway Association Holds Annual Meeting

AT THE annual meeting of the California Electric Railway Association in San Francisco on May 19 there was a detailed discussion of the problems confronting the California companies at the present time. The increased cost of operation, increased labor and material costs and automobile competition were some of the foremost topics. It was decided to continue the association for a term of three years and plans were arranged accordingly.

W. V. Hill, who managed the affairs of the association in San Francisco previous to taking up his duties at Washington for the American Association, is to return to San Francisco to take care of the interests of the California Association immediately after the conclusion of the present special session of Congress. Mr. Hill was present at the May 19 meeting, but left for Washington immediately afterward.

The election of officers resulted as follows: W. R. Alberger, vice-president and general manager San Francisco-Oakland Terminal Railways, was elected president; W. E. Dunn, vice-president Los Angeles Railway Corporation, vice-president; W. V. Hill, manager. Jesse W. Lilienthal, president United Railroads of San Francisco; W. Clayton, vice-president San Diego Electric Railway; Paul Shoup, president Pacific Electric Railway; W. R. Alberger and W. E. Dunn were reelected members of the executive board.

The proposed increase of fares by the London General Omnibus Company is objected to by the Westminster City Council on the ground that it would create a traffic monopoly against the interest of omnibus users and ratepayers. It was also decided to investigate the working and management of the company with a view to providing out of its revenue a direct contribution to the upkeep of the highways of the city and elsewhere.

## International Association Begins Again

### Executive Committee Issues Call — Subjects of Enemy Nations to Be Excluded from Body

UNDER date of May 3, the president of the Union Internationale de Tramways et de Chemins de Fer d'Intérêt local, C. de Burlet, has announced the reestablishment of the association. The notice was issued from the office of the secretary at Rue d'Arlon 23, Brussels, and is signed by President de Burlet. It reads as follows:

It is with a feeling of great satisfaction that the executive committee, after a long and sad separation, is able at last to renew its communications with the members of the association. The events of the terrible war have had their effect on the association, and radical changes are necessary to maintain its existence and prevent its work of years from being irredeemably lost.

In view of the new international situation the executive committee, at a meeting on March 22, decided that the only solution possible was the dissolution of the organization as it had existed and then its immediate reorganization with members only from countries of the allies and the neutral countries. An association embracing all countries being considered morally impossible at the time, the executive committee assumed the responsibility of the measure mentioned and now asks ratification of its acts as soon as the circumstances permit. The act is legal because under a decree of the Belgian Government the property and rights of the citizens of an enemy country are subject to confiscation, and similar laws have been passed in all of the countries of the allies. The association has already given notice of this action to those who will be affected by it.

Through a surplus balance left from previous years, the executive committee has been able to administer the affairs of the association during the period when mail communication was interrupted between its office and the greater number of its members. This is in spite of the fact that no dues have been received since 1914. It is the intention of the executive committee not to collect any dues for the years 1915, 1916 and 1917, but to enable the association actively to begin its work again, issue reports, etc., members are invited to forward to the secretary their dues for the years 1918 and 1919.

Article 13 of the bylaws fixes the dues for active members (tramway companies) as follows:

For annual receipts of:

| | |
|---|---|
| (a) Less than 1,000,000 francs | 50 francs a year |
| (b) Between 1,000,000 and 2,000,000 francs | 100 francs a year |
| (c) Between 2,000,000 and 3,000,000 francs | 150 francs a year |
| (d) Between 3,000,000 and 4,000,000 francs | 200 francs a year |
| (e) Between 4,000,000 and 5,000,000 francs | 250 francs a year |
| (f) More than 5,000,000 francs | 300 francs a year |

The annual dues of individual members are 20 francs, those of associate member companies (firms, etc., interested in the tramway industry) are 100 francs.

Members will shortly receive a volume containing the questionnaire of the Christiania Congress and a certain number of reports which were issued in expectation of the Budapest Congress. The sending out of these reports, whose printing had not been finished in 1914, will follow immediately on the receipt by the association of the dues mentioned above.

Important changes have occurred or are inevitable in the tramway and light railway business as in all branches of industry, and it is of the greatest importance at this time that all companies and individuals engaged or interested in tramways should give their experience.

The committee counts on the active co-operation of all its members. It is happy to say that from all sides expressions of sympathy and hopes of seeing the association revived have been received at its headquarters. It hopes to inspire the same sentiments among all for a work commenced thirty-four years ago so that the association may carry out its purposes for the good not only of the companies but also of the public and all directly and indirectly interested in the development of intercommunity transportation.

All communications should be addressed to the secretary, H. Camp, 23 Rue d'Arlon, Brussels, Belgium.

# Some Principles in the Training of Car Men

## It Is Not Necessary for a Motorman to Cause an Accident to Train Him in Safe Car Operation

BY E. C. CLARKE

A MAN may be told a thousand times to be careful but he does not understand unless he has been properly instructed. Not knowing of danger he cannot avoid it.

A car may be equipped with every known safety and economy device and every part of the car may be in excellent condition, but all appliances become useless unless the trainman has been properly instructed. An improperly instructed motorman will send the best car that was ever manufactured to the scrap heap. And the money paid out for accident claims amount to more than the cost of the car in some cases.

It is quite a different story if the motorman has been fully instructed. For instance, take an old-style hand-brake car that is not equipped with a single safety device. The controller may be stiff and the pawl spring broken, and there may be too much slack in the brake chain making it exceedingly hard to stop the car—in fact, the general condition of the car may be very bad. Place in charge of such a car a competent motorman, who has been properly instructed regarding the car equipment and the careful operation of a car through the streets, and he will operate the car safely. In all probability he will not keep the car on time, for having been properly instructed he will realize that the safety of passengers and the car equipment is the first consideration. He will operate the car to the depot safely but he will be tired and worried and will, of course, want to change the defective car for one that is in good condition.

It has not been a great while since raw recruits were assigned for instruction to a motorman who did not fully understand the operation of a car. In fact, there are cases of this kind now. After a few trips with such an instructor the recruit was pronounced competent, but what happened when he started to work for himself? It was necessary for him to learn how to operate a car in a manner of his own creation. If anything happened to be on the tracks in front of his car while he was learning it was a case for the wrecker, the ambulance or the coroner, and not infrequently all three were needed.

It has been said that a man is not a good motorman until he has had an accident, the cause assigned to this fallacy being that in having the accident the motorman saw how it occurred and can avoid a repetition. If there is anything in such a statement it is simply that the accident frightened the man into being more careful. The chances are that he is so occupied in stopping the car that he is prevented from seeing just how the accident occurred. Obviously the paying of accident claims is a very expensive method of instruction.

The past few years have brought a crying need for the systematic instruction and following up of operating department employees. Cars and trains have become greatly overcrowded and the streets are congested with pedestrians and vehicular traffic. There is a demand for speeding up of schedules and the prevention of accidents.

While the multiple-unit system of control, with the automatic air brake, has been used for some time on elevated, subway and interurban trains, such equipment has only recently been installed on surface cars. Such cars are now being equipped with devices to insure the proper operation of the controller, to save power and reduce brakeshoe wear, but the desired results are not to be obtained without a proper system of instruction.

The most recent improvement in cars and car equipment is the one-man safety car. While the safety car is simple it is just enough different from other cars to require special instruction in order to secure the best possible results in operating the equipment and handling the passengers.

### VISUAL MEANS SHOULD BE UTILIZED FULLY IN INSTRUCTION WORK

A recruit to-day must be carefully selected; then sent to a school where he can be thoroughly instructed with regard to the different parts of the car equipment and the functions they perform. The student should not only be instructed as to the proper operation of the equipment, but also should be shown the damage resulting from improper operation. This is not only necessary for the comfort of the passengers but for the prevention of abuse of the equipment. The different pieces of apparatus should be arranged so that the student can be shown as fully as possible the functions performed by each part. There should be no mysteries about any piece of apparatus or the duties it performs.

When the student passes through the school successfully he should receive instructions from a corps of instructors selected from each line and properly qualified at the school. The instructor and the student should be advised and coached by a force of instructors who act in a supervisory capacity.

While the student is receiving actual instruction on the line under the guidance of competent instructors it is possible for the latter to explain conditions and situations in the street that produce accidents. The supervisory instructors should ride with the new man just as soon as he starts to work for himself, advising and coaching him in his duties. The thoroughness of such a system will make it no more necessary for a new man to have an accident just to see how it occurs than it is to look down the barrel of a gun to see what happens when the trigger is pulled.

To supplement verbal instructions, drawings, stereopticon slides and motion pictures are of great value in showing how accidents occur and how they can be avoided. The most natural method of instruction is through the eye. An additional value of the pictures is that they are presented when the student is at ease in a comfortable seat, thereby making it possible to secure his undivided attention. Stereopticon slides and motion pictures cannot be surpassed in illustrating the car equipment and the functions performed, particularly those operations that cannot be seen otherwise. Animated drawings visualize such work and relieve the effort to understand the operations.

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The Canadian Engineering Standards Association has been incorporated for the same general purposes as those of the similar organization in Great Britain and the proposed American Engineering Standards Association in this country.

## Inaugurating Safety-Car Service in Ogden

AFTER the Utah-Idaho Central Railroad had decided to make a trial installation of seven one-man safety cars on its lines in Ogden, Utah, the management made a special study of introducing them with the greatest possible satisfaction to the public and the employees.

A special effort was made to inform the public as to what safety cars were accomplishing in other cities, and the co-operation of several "boosters" on each line was secured to assist in this phase of the work. As soon as the first car arrived it was well limbered up and its operation was demonstrated to a party comprising the Mayor, the city commissioners, newspaper men and the company officials. The result was reflected in an editorial in the *Ogden Standard* where, after listing some of the good features of the cars, the editors said: "All of these and other accomplishments of the one-man safety cars show that the street railway company in Ogden is making an advance step which will be appreciated."

To secure intelligent co-operation on the part of employees the men were given thorough training on two lines on which, fortunately for the purpose, there was very little passenger traffic. Furthermore, without any reference to the further use of the one-man cars in Ogden, the following clause was put into the wage agreement with the carmen: "Conductors or motormen required to work safety cars will receive 5 cents per hour in addition to their regular pay." In consequence there was no discussion necessary with the men at the time the cars went into operation and the publication of the unfavorable newspaper comment usually accompanying such discussion was avoided.

## Welding Transformer with Adjustable Secondary Winding

A NEW type of alternating-current arc-welding transformer has been developed and has been given the trade name of "Zeus" by the maker, the Gibb Instrument Company, Detroit, Mich. The transformer is mounted in a box provided with line and welding circuit terminals. One of the particular features in this equipment is its arrangement for regulation of welding current through the raising and lowering of the secondary winding of the transformer. This is accomplished by means of a rack-and-pinion connection operated by a hand wheel installed on the top of the transformer box.

A. C. WELDING OUTFIT FOR CONVENIENT ADJUSTMENT OF SECONDARY CURRENT

The "Zeus" is arranged for unit installation and it is recommended that a 150-amp. outfit be installed and as the work increases a duplicate may be connected in parallel with the original machine.

## More Light on the Situation

### National Chamber of Commerce Continues Its Study of the Vital Needs of Electric Railways

IN THE furtherance of its plan to make a thorough examination of the critical condition of the electric railway industry, the public utilities committee of the Chamber of Commerce of the United States held its second hearing in Washington, D. C., on May 28 and 29. The sessions are still going on as this issue goes to press, and for this reason a detailed report of the proceedings will not be published until the following issue.

It may be said now, however, that the various speakers gave a clear-cut picture of the essentiality of the electric railway industry to the nation's welfare and of the inevitable disaster that will follow a continuance of the existing situation. The efforts made to secure relief through more elastic franchises, through fare increases and through the curtailment of tax burdens were all described in detail.

For example, L. R. Nash, of Stone & Webster, Boston, Mass., discussed the various efforts that have been made in recent years to perfect the service-at-cost franchise, and other speakers took up this and other points in connection with individual communities. John W. Van Allen described the complex difficulties of the Buffalo fare situation and the still unsuccessful efforts to find a means of settlement. The conditions of the lines in their respective cities and salient points regarding the franchises were mentioned by Walter A. Draper, vice-president Cincinnati (Ohio) Traction Company; W. C. Culkins, director of street railways in Cincinnati; Britton I. Budd, president Chicago (Ill.) Elevated Railways, and Lucius S. Storrs, president the Connecticut Company. The points most emphasized by all were the need of flexible service-at-cost franchises and of a better understanding on the part of the public of its responsibility for and interest in successful railway operation.

Another highly significant point was that made by T. S. Holden, economics investigator of the Division of Public Works and Construction Development, Department of Labor, in regard to the 1919 price situation. Mr. Holden averred that no recession in the general price level should be expected for several years. He added that there was no reason to assume that a 5-cent carfare was to-day "normal," for a normal rate now is one based upon the cost of production under present high price conditions.

The members of the public utilities committee present at the hearing were Lewis E. Pierson, New York, N. Y., chairman; P. H. Gadsden, Philadelphia, Pa.; Arthur W. Brady, Anderson, Ind., F. B. De Berard, New York, N. Y.; E. K. Hall, New York, N. Y.; Charles L. Harrison, Cincinnati, Ohio, and P. N. Myers, St. Paul, Minn.

In its second quarterly report to Congress the Rehabilitation Division of the Federal Board for Vocational Education gives the number of registrations of disabled men up to March 15 as 49,161. At the time of their registration all of these men were prospective cases for vocational re-education or for placement without training in suitable employments.

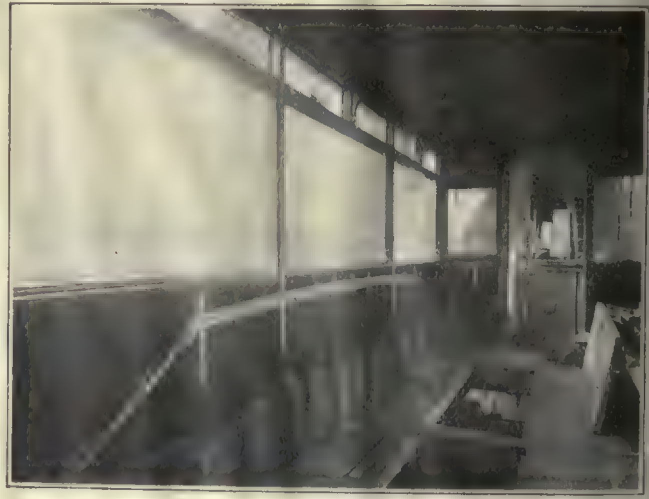
# Car Body Maintenance in Belfast

### Original Improvements Which Have Been Made to Prolong the Life and Strengthen the Structure of Double-Deck Cars

By P. Williamson
Car Works Superintendent Belfast City Tramways

FOR a number of years tramways throughout the United Kingdom have been experimenting in a variety of ways, so as to improve their rolling stock and lengthen its life. In this direction it has become established that, since the introduction of top covers to the old, standard, wooden underframe type of car, many difficulties have arisen that are mainly due to heavy loading and higher speeds. These conditions have now become responsible for much distortion and hogging at the ends of the bodies, which not only detract from the general appearance, but shorten the life of the main structure and increase the cost of maintenance very materially.

DOUBLE DECK CAR WITH TOP COVER



INTERIOR VIEW OF BELFAST CAR

The builders of this class of rolling stock have for a number of years followed the practice of bracing the framework together with a light iron rod (the lower one in the interior illustration) to the inside of the side members, and securing it in position to the ends of the sole bar (side sill) with a strong adjustable nut. To a great extent this method has proved in itself deficient for the purpose for which it was intended, and it has now become necessary to improve upon it so as to restore the cars to their original shape.

After many years' experience in the building and maintenance of this class of rolling stock, the writer has developed several improvements that have been found to overcome some of the difficulties in Belfast. These methods are applied when the cars are passing through the workshops for a general overhaul. In order to inspect, repair and repaint them thoroughly it was found necessary completely to remove the internal structure so as to simplify the labor in fixing new floor boards, wheel covers, and heelboard rails. The advantage of this is the obtaining of a clear opening for the inspection of the head stock, bolster and center bearer, and it simplifies the removal of defective bolts that are likely otherwise to be overlooked. At this stage of the work, we take the opportunity of fitting a new trussing device (shown in the interior view) by fixing a spring-steel bar 9 ft. x 2¼ in. x ⅜ in. to the intermediate and stump pillars (short posts), which are checked out ⅜ in. to form a level at all bearing surfaces, and 4 in. from the top edge of the bottom glass rail (window sill). We have found it an advantage to shape the steel bar to a 2¼ camber, as that has the effect of regulating the strain to a greater degree. The ends of the steel bar are set in the direction of the corner posts shoulder and side sill, and drilled to accommodate a ⅝-in. cast-steel connecting pin. At the junction of the corner post and side sill, there is attached and bolted a malleable-steel knee 2¼ in. x ¾ in. with a lip directly in the center, and drilled to take a ⅝-in. steel cotter pin. To these two steel pins at each corner of the cars are fixed ⅞-in. connecting rods with 5-in. turnbuckles, and so arranged that when necessary they can be used for adjustment by removing the back portion of the seat only, which in no way incurs any further labor. In combination with this arrangement the intermediate glass pillars (window posts) have been reinforced with T-section steel 1 in. x 1 in. x ¼ in. set in flush, which extends from the cant rail (to the existing portion of the builder's truss rod) and is screwed firmly along the outer edges. This device not only has the effect of strengthening the posts and other parts of the main framework, but has been the means of overcoming all troubles with leaky windows.

It has been found by cutting away 2¼ in. of the above-mentioned 1-in. x 1-in. x ¼-in. web that this serves as a keeper plate for retaining the truss bar in the required position. At the extreme ends of the 2¼-in. truss bar, it has been found to be a much better plan to use angle iron 1½ in. x 1½ in. x ⅛ in. as retaining plates to protect the timber of the short posts, where the portion is notched out, in place of the flat iron so commonly used for similar purposes.

Continuing along these lines, another improvement has been added by lining up the window sills with lengths of hardwood and screwing steel plates 1½ in. x ¼ in. to the underside of the timber before finally securing these to the window sills. By this method we have been able to restore the window sills to their original shape and to improve greatly the appearance of the cars.

The floor bearers (sills) have also required attention as the earlier construction of these members of the car was altogether unsuitable and unreliable to sustain the requirements of heavy traffic conditions. The original method of fixing the center sill in position was by means of an iron bracket bolted to the inside of the side sill, the sills being secured by bolts to the brackets. This form of fixing, however, proved to be very unreliable as the whole weight entirely depended upon two ½-in. diameter bolts, which were so arranged that inspection was most difficult. It has been overcome and all further danger of breakage of bolts, etc., removed by redesigning the malleable-iron bracket and extending the side flanges so as to utilize the top of the side sill for bolting-down purposes, instead of relying solely on the side bolts. Along the bottom sides of the sills we have fixed angle steel 1¾ in. x 1¾ in. x ¼ in. made flush on each surface, the object of this arrangement being to retain the bar in shape and maintain an even appearance of the floor generally.

### BOLTS CUT OFF AND HOLES ELONGATED BY HEAVY LOADS CARRIED

The constant use of the mechanical brakes, and the excess load of passengers occupying the platforms are responsible for the displacement of the wooden sills and the bolster. In many instances we found on inspection that the ends of the bolts (that pass through the side sill and angle steel) were completely cut away, and the holes quite elongated. To overcome the wear and to prevent excessive strains having a detrimental effect, we have attached to the side sill bolt a malleable-iron stay, angular in form, with a broad, flat surface shouldered to rest upon the top edge of the steel angle bar, and finally held in position to the side of the short posts by two hexagon bolts and nuts. Many advantages have been obtained by this arrangement, more particularly where the tenons of the wood bar enter the mortices in the side sill, as previous to this alteration we were compelled in some cases to renew the side sill owing to breakage having been found at the mortice holes. Frequent removal of the trapdoors of the main flooring for inspection of the motors, etc., resulted in a very noticeable amount of wear taking place on the outer edges of the boards, and, in view of the scarcity of this class of timber, which is difficult to obtain, and the necessity for the practice of the utmost economy, it has been found to be a great benefit to fix light angle iron 1¼ in. x 1¼ x ⅛ in. to the worn edges of the boards. This lengthens the life and does not interfere in any way with the removal of the trapdoors. Together with this alteration we have added angle irons 1½ in. x 1¼ in. x 3/16 in. to the floor runner bars (that are set in below the heel boards) the advantages of which are the supporting of the heavy weight of passengers standing and also the regulating of shrinkage that occurs during the summer season.

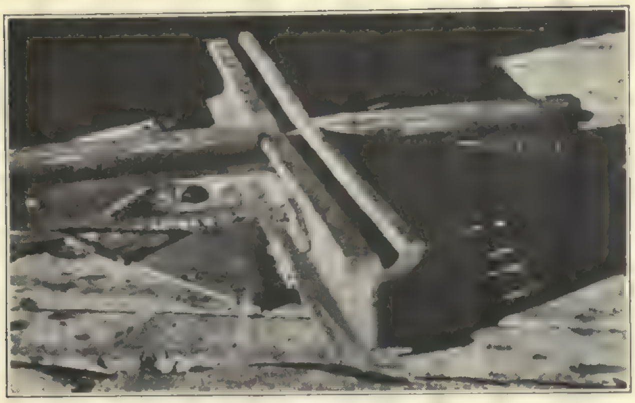
Since the addition of top covers to the Belfast double-deck cars a greater tendency in the direction of heavier loading has brought about many defects in certain forms of car construction. In view of the fact that many difficulties present themselves in the way of combining both body and top cover in a more solid form, it has become essential in Belfast to provide other methods to secure these two parts more firmly together. In this direction we have been able to devise means whereby we brace both structures together, which relieves the strain thrown upon the joints. Our method has been to fix two braces of iron 2 in. x ¼ in. along the inside of the bottom window sill, thickened out to ½ in., made in the form of a knee at each end, to accommodate a ⅝-in. hexagonal nut, provision having been made for screwing up by extending the iron brace 2 in. beyond the outer edge of the corner posts. To the center of the window sill an iron plate 7 in. x 2 in. x ¼ in. is set in level, screwed with countersunk iron screws. The other two holes adjoining are drilled ⅜ in. and tapped to receive countersunk metal-threaded screws. The surfaces of the iron braces are drilled for countersunk wood screws spaced at short intervals and firmly fixed to the window sill. On each side of the body canopy rim a cast-brass sleeve (formed on an angular surface plate) is fixed about 2 ft. 6 in. from the end of the corner post. To the ends of the iron brace we have fixed a mild steel rod ⅝ in. in diameter with screwed ends, and at the brass sleeve an easy form of adjustment is arranged, which provides an even support and hold to this essential part. In many other forms we have found angle iron ¾ in. x ¾ in. x ⅛ in. to be of great service, and by fixing it to the top edges of the decency boards (dress covering at the staircase landing) it has been the means of improving the appearance and overcoming all wear which is brought about by thoughtless passengers using these as foot rests.

Where inside portable wood seats are in use it is frequently found that the front rail warps, thereby causing the ends to curl upward (more especially where the body framework is out of line) and much annoyance and danger have resulted from this source. To avoid renewing the timber it has been found that by reinforcing the wood rails on the lower side with ¾-in. x ¾-in. x 3/16-in. angle steel, much trouble and expense are avoided, and the danger of passengers' clothing becoming entangled and damaged is considerably reduced.

### GUTTERS INSTALLED AT ENDS OF CANOPIES PROTECT PASSENGERS

Included with the above, the labor involved in washing and cleaning the cars has been brought under similar consideration, in the way of arranging a device to preserve the paint and protect passengers from objectionable drenchings when entering or leaving the car.

This provision is made in the form of a wooden gutter, screwed to the front cant rail and canopy rim, directly below the nosing of the roof boards, in continuous form with the outline of the roof. At the staircase sides only, a portion has been slotted out of the bottom of the wood gutter, to form an outlet for rain or snow. Directly below this aperture a brass casting has been fixed, made in the form of a trunk head, and so arranged on the corner post to provide for the intake of rain. To this attachment is fixed a ¾-in. copper tube, that extends to the bottom of the side decency board (which is cut away to make provision for the tube in direct form), and to this junction a double elbow is attached in sleeve form, which provides for an additional length that passes down the end of the body corner post and terminates 6 in. below the platform boards. By this contrivance we claim to have not only reduced the labor in washing and repainting, but also to have protected passengers from much annoyance during wet and stormy weather, and in addition we find that a better appearance of the car is very simply maintained.

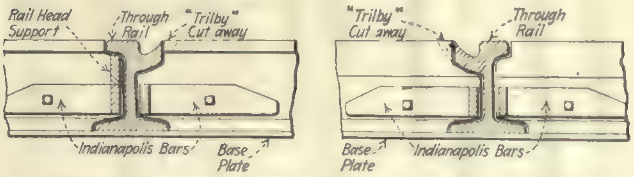


CROSSING RAILS BEING WELDED TO BASE PLATE IN THE SHOP

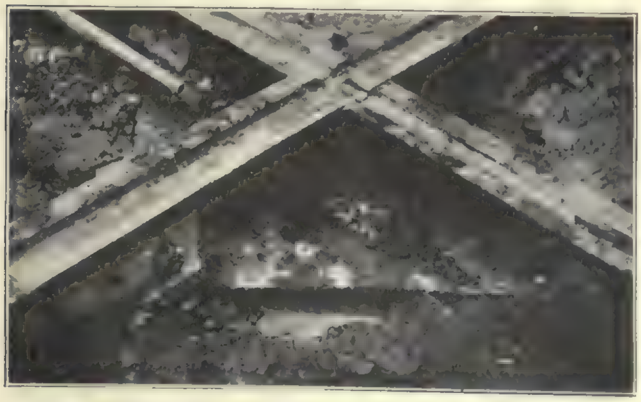
# Emergency Special Work Made With Arc Welder

### Kansas City Railways Use Arc Welding Equipment to Build Right Angle Crossings for Emergency Use

During the latter part of December, 1918, Kansas City was visited by a very heavy fall of wet snow which on account of existing labor conditions was not promptly removed from the streets and was speedily packed into a sheet of ice over all the tracks. The traffic over the rails and special work constantly packed this ice into the crevices and breaks in the special work, and many pieces which ordinarily would have lasted for some months were destroyed by spreading, lifting of the hard centers and breaking of the bolts and fastenings. The result was that when the snow was finally cleared several crossing frogs were almost impassable and were in danger of breaking equipment every time they were used. A period of at least sixty days would have been necessary to secure repair pieces and a very considerable time would have been required to make up bolted work in the shops. The latter plan was impracticable on account of the crowded condition of the shops at that time.



DIAGRAMS SHOWING SHAPES TO WHICH RAILS WERE CUT BEFORE JOINING



SECTION OF KANSAS CITY EMERGENCY CROSSING INSTALLED

Under these circumstances the Indianapolis welder was utilized in such a way that five crossing frogs were turned out at the rate of one per day by four men. These crossings were constructed of a section of 7-in. grooved rail, one length serving as through rail, with a section of the "Trilby" cut away and a flangeway cut through the ball. The other rails were shaped and cut by means of hacksaws to fit against the through rail and all were welded to a base plate. Then knee braces made of standard Indianapolis bars bent to the proper angle were welded to the webs of the rails.

The crossing made up as above had the weakness that the ball of the rail was unsupported at the flangeways. This was remedied by fitting a block of steel between the under side of the rail head and the top of the knee braces and welding it in place. In addition the bottom flangeways were built up to form flange-bearing crossings.

These crossings were made to meet an emergency, but they are holding up well, and it is possible that crossings of this type may be used in more permanent construction.

# New Construction Used for Automatic Reclosing Circuit Breaker

The accompanying illustration shows a new circuit breaker, type "LRL" of 3000 and 4000-amp. capacity, recently put on the market by the Automatic Reclosing Circuit Breaker Company. This breaker is an electro-magnetically operated circuit breaker, having the following characteristics: (1) Breaker is closed and held closed by means of an electromagnet. (2) Opens automatically in case of overload, short-circuit or voltage failure. (3) Remains open a definite time interval regardless of cause of opening. (4) In case breaker is opened by a short-circuit, the breaker makes no attempt to reclose while the short-circuit exists, but closes instantly upon the removal of short-circuit or overload. The main contact brush is of a laminated butt contact type. The studs are of laminated construction, the lower stud being slotted vertically and the upper stud being slotted horizontally. The main contact brush is protected from arcing by an auxiliary copper contact shunt and the final arc is formed on upper "graph-alloy" contact tips. The upper arcing tip is supported on a pivoted support actuated by a strong compression spring so that the upper rear tip follows out a considerable distance in opening, thereby insuring good contact of the arcing tips until brush and auxiliary contact are separated from their respective contacts. The upper rear arcing tip is also pivoted directly on a bracket so that it is free to align itself with the front contact in all positions. Provision is made for adjusting the tension of the main brush by means of an eccentric bushing in the brush support.

AUTOMATIC RECLOSING CIRCUIT BREAKER FOR LARGE CURRENTS

# American Association News

COMMITTEE ON POWER GENERATION AND ONE-MAN CAR COMMITTEE HOLD MEETINGS—ACTIVITY IN THE NEWARK AND CHICAGO COMPANY SECTIONS

## Power Generation Committee Holds Two-Day Session

THE committee on power generation of the Engineering Association held a meeting at association headquarters in New York on May 26 and 27 to discuss the subjects which had been assigned to it for consideration. Those present were A. B. Stitzer, New York, chairman; R. W. Eaton, Providence, R. I.; C. R. Greenidge, New York City; Charles S. Lloyd, East Pittsburgh, Pa.; W. C. Slade, Providence, R. I. and Howell Van Blarcom, East Pittsburgh, Pa.

Considerable time was spent in a discussion of the points which are considered necessary for inclusion in the report on the development of the automatic substation. The replies received to the questionnaire sent out to secure information on the operating performances of railway power stations were reported to have been tabulated. The data were considered in detail and recommendations were made regarding additional data which it seemed advisable to secure. The considerations necessary to be included in a form of power contract for the purchase of railway power were also discussed. From replies to a questionnaire sent out on railway operating conditions it appears that the majority of the member companies are buying their power. It was decided that these companies be asked to furnish copies of forms of contract under which they are purchasing power, and that the different items entering into these contracts be tabulated by the committee for convenience in determining the parts that can be recommended for further consideration. A digest is to be made for the guidance of companies who are desirous of making new contracts.

## One-Man Car Committee Interested in "Movie" Film

THE joint committee of the Transportation & Traffic and Engineering Associations on one-man car operation met at the association headquarters, New York City, on May 23. The members of the committee present were C. W. Kellogg, Boston, Mass., chairman; C. H. Beck, St. Louis, Mo.; J. M. Bosenbury, Peoria, Ill.; S. W. Greenland, Fort Wayne, Ind.; J. K. Punderford, New Haven, Conn., and Clarence Renshaw, East Pittsburgh, Pa.

A tabulation, prepared by J. W. Welsh, of the results and experiences with one-man car operation as shown by replies to the questionnaire sent out was reviewed by the committee and recommendations were made for important items to be included in the final report.

Mr. Beck reported on a meeting held in St. Louis to devise a plan for taking moving pictures of one-man car operation and construction. The plan proposed was discussed by the committee at considerable length and the general opinion was that this is a very advisable undertaking and should prove of great benefit to the industry.

## Transportation Department Work Analyzed at Newark Meeting

THE Public Service Railway Company section met on May 23 at Newark. A paper on the work of the transportation department, abstracted on page 1049 of this issue, was read by Alexander Jackson, superintendent of time-tables of the company. R. E. Danforth, general manager, Public Service Railway, discussed the paper, approving the practical suggestions made by Mr. Jackson.

William Arthur, New Haven, Conn., spoke informally on power saving and discussed means which are available to this end. He gave data as to results which had been secured in several parts of the country. Mr. Arthur put his thoughts into everyday language, avoiding technical terms, so that others than engineers would see the force of his arguments.

The membership committee reported a substantial number of new members for the month and stated that its campaign will be carried on throughout the summer.

## Mr. Budd Addresses Chicago Section

AT THE meeting of the Elevated Railways company section, held in Chicago on May 20, President B. I. Budd of the Elevated Railways briefly outlined the present serious condition of the electric railway industry, with special reference to the local properties. He pointed out why it is to the interest of the individual employees as well as to the company to do all that can be done to acquaint the public with the facts in the case. He especially urged the necessity for full co-operation between men occupying supervisory positions and those with whom they worked. Maj. D. L. Smith gave a recital of his work with the 149th Field Artillery in the war zone.

By way of entertainment J. H. Mallon spoke humorously on the Irish question and there were also some vocal selections.

## Big Questions to Come Up

ON MAY 28 a joint meeting of the committee on national relations and the committee on readjustment of the American Electric Railway Association was held at the Washington office. Those present were P. H. Gadsden, Philadelphia, Pa., chairman; Arthur W. Brady, Anderson, Ind.; Britton I. Budd, Chicago, Ill.; L. S. Storrs, New Haven, Conn.; W. A. Draper, Cincinnati, Ohio; Myles B. Lambert, East Pittsburgh, Pa.; and C. C. Peirce, Boston, Mass.

At the outset Mr. Gadsden reported on the recent events culminating in the recommendation of Secretaries Redfield and Wilson as noted in last week's issue, that President Wilson appoint a special commission to investigate the general electric railway situation. A general discussion then ensued as to the course of procedure this commission, when appointed, could with advantage follow. It was felt that a national report on the general plight of the industry would be beneficial in helping to make the public realize the needs of the electric carriers.

It was pointed out also that besides the work of this investigating committee other matters of general importance are pending or will soon be coming up. These include the hearings on compensation for mail haulage, the hearings on short-line rates and connections, legislation regarding the return of the steam railroads to their owners, new valuation instructions and labor legislation. With all of these, it was believed, the industry must keep closely in touch.

# LETTER TO THE EDITORS

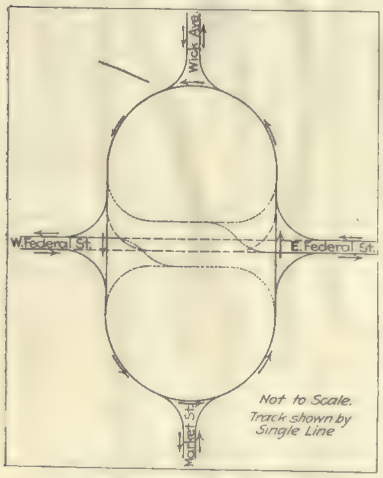
## Relieving Downtown Congestion at Youngstown, Ohio

120 BROADWAY,
NEW YORK CITY, May 23, 1919.

To the Editors:

The article on "Relieving Congestion at the Diamond in Youngstown," appearing on page 969 of the issue of the ELECTRIC RAILWAY JOURNAL for May 17, presents an interesting problem in whose general solution many communities are interested, but comparatively few of these are so happily circumstanced as is Youngstown to effect a solution.

While it is some years now since I was called upon to examine the operation of the Youngstown property I was impressed at that time with the desirability to both the public and the railway, of through-routing practically all lines, turning none at the "Diamond." If for any reason that is not done, the present layout is admirably adapted, with probably a minimum of expense entailed, to permit safe, prompt and adequate operation through the business center, for either through routed or radial plans of operation; in either case provision being made for the through interurban service on Federal Street.



SUGGESTED TRACK LAYOUT AT CIVIC CENTER IN YOUNGSTOWN, OHIO

The conditions to be met, in the order of their importance, are: (1) Safety or greater safety of passengers and public, (2) improved convenience to both passengers and general traffic, (3) increased speed of all traffic through this center. To secure these results in the best and quickest way the city and the company must co-operate. The present operation as reported is obviously unsatisfactory and unsafe; the ultimate solution proposed has several objectionable features from both the public and the company's standpoints.

As a suggested solution the accompanying sketch is presented in which two distinct, non-interfering, minimum loops are proposed, yet through routing in any direction is left possible. In the diagram the dash lines show the present track within the loop, and the dotted lines the track which I suggest adding.

In the proposed plan it is assumed that the general traffic will be diverted (if it is not diverted already) from Federal Street at the center of the "Diamond" and required to follow the course designated by the arrows. This would leave the relieved space free for boarding, alighting and transfer passengers, and would involve for the last-named a minimum of street traverse, an important consideration in inclement weather. Track crossovers, or "Y's," should now be located within reasonable distance of the loop on all four approaching trunk lines as an insurance of continuity of service in case of blockade (from fires, etc.), occurring adjacent to the "Diamond."

Of course, if it be that the Federal Street track at the center of the "Diamond" either now needs or shortly will need replacement, the net cost of the work outlined will be much reduced; but in any event it looks as though the improvement were not only well worth while but readily possible through the joint efforts of the city and the company, and both have much to gain. The diagram should be sufficiently clear to need no further explanation. W. B. YEREANCE.

## New England Club in Prime Condition

AT THE dinner meeting of the New England Street Railway Club held on May 22, 1919, new members to the number of thirty-one were elected. J. E. Dozier, who presided, expressed appreciation of the manner in which the members had co-operated with the membership committee in enlarging the membership. He announced that the executive committee had decided that the next meeting, to be held about the middle of June, shall take the form of an outing.

The principal speaker at the meeting was Harlow C. Clark, of the American Electric Railway Association staff. His address was abstracted at length in the issue of this paper for May 24, page 1011. E. B. Burritt, secretary of the American Association, was also present. He explained some of the recent activities of that association, particularly the work of the committee on readjustment, and of the information bureau. He outlined the plans for the Atlantic City convention and referred to the approval by President Wilson of the appointment of a federal commission to deal with the electric railway situation. (See ELECTRIC RAILWAY JOURNAL, May 24, page 1015.)

The club passed a resolution of thanks to Messrs. Clark and Burritt for their assistance and of appreciation of the work of the association.

An agreement is being reached between the employers and the vehicle workers in London looking toward improved working conditions for the London omnibus drivers and conductors. The proposed agreement provides for a guaranteed week of forty-eight hours, based on six eight-hour days; six days holiday with pay, and bonuses annually to all men who had served for six months on Jan. 1; payment of overtime based on an agreed basis, and arrangement in regard to spread overtime.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Buffalo Work Negatived

### Disapproval of Enabling Legislation by Governor Regarded as Reopening Whole Railway Case

The failure of the enabling legislation planned for the city of Buffalo, N. Y., referred to in the ELECTRIC RAILWAY JOURNAL for May 24, means that the work of the board of arbitration which has been trying to determine the physical valuation of the properties of the International Railway within the city will probably go for naught. The situation now reverts back to where it was more than a year ago when the municipal authorities were trying to solve the railway problem without granting an increase from the 5-cent fare.

The only chance for the International to get higher fares now rests with the appeal taken by the city from the decision of the Appellate Division granting the Public Service Commission for the Second District authority to hear the case brought by the municipality to determine what is a reasonable rate of fare in Buffalo.

### PRESIDENT CONNETTE STILL HOPEFUL

E. G. Connette, president of the railway, is unable to see why Governor Smith vetoed the so-called Brady-Graves bill. In an interview he is quoted as saying:

> I cannot see any immediate danger of suspension of railway service in Buffalo as the result of the Governor's veto. It looks to me as if the whole matter will ultimately revert to the Public Service Commission, which will determine and fix a fair rate of fare in Buffalo. This is the new view held by our attorneys after brief consideration of the meaning of the Governor's action. The one thing that I cannot understand is the Governor's sudden change of views on home rule and municipal ownership. He has preached the doctrines of home rule in his election speeches and now goes directly against his avowed policy. The Brady-Graves bill, while perhaps far from perfect, seemed to be the best plan put forward for the solution of Buffalo's traction problems. It was a decided step toward municipal ownership, which Governor Smith had said he favored, yet he disapproves of the bill despite these features.

In a letter to Governor Smith in which he expressed disapproval of the measure, Charles B. Hill, chairman of the Public Service Commission for the Second District, said:

> If the bill should be found to be constitutional, its effect, so far as concerns the territory occupied by the International Railway, will be to abrogate completely the general legislative policy of the State as expressed in the public service commission law and the railroad law, and to surrender the police powers of the State as expressed in these laws in their entirety, so far as affects the large and important section of the State occupied by the International system, both within and without the boundaries of the city of Buffalo.

For three weeks the board of arbitration has been taking testimony as to the physical valuation of the International properties within the city of Buffalo. This figure would be used as the basis of a service-at-cost agreement with the city. The three arbiters will be paid jointly by the city and company. No additional sessions of the board will be held pending the decision of the City Council to discontinue all further proceedings of this character.

## To Electrify Suburban Lines

Officials of the Illinois Central Railroad have agreed with the Chicago Commission on Railway Terminals and a sub-committee of the City Council committee to a fifteen-year electrification provision being written into the proposed ordinance for the improvement of the south shore.

The provision is that within five years after the passage of the ordinance the railroad agrees to have its suburban service electrified. The next five years will bring electrification of the freight service north of Twelfth Street, and the next five years the balance of the freight service south of Twelfth Street.

With this agreement the remainder of the ordinance can be drawn up, and it is expected that the measure will be submitted to the Council within a short time.

## Another Service-at-Cost Proposal

A service-at-cost franchise has been submitted to the Council by the St. Paul Street Railway, included in the system of the Twin City Rapid Transit Company. The question of valuation is likely to be much debated as a basis for the franchise and it is probable the city will hire an expert to make a valuation.

The proposed franchise provides for a board of arbitration to decide moot questions between the city and company; submission to voters ninety days after approval by the two parties; one year notice if city wishes to buy the property; agreement to be reached on capital valuation plus reserve fund of $250,000; rates of fare to be based on cost of service, with the possibility of a change of rates every two months; reserve fund to stabilize fares; St. Paul to be credited with eastbound fares collected east of the city limits of Minneapolis and Minneapolis with revenue west of Snelling Avenue in the city of St. Paul.

When earnings have decreased so the reserve fund is less than $250,000 fares may be increased, and vice versa. This reserve fund is to come from surplus after fixed charges have been taken out.

## Homes for Its Employees

### $50,000 All Absorbed That Was Set Aside by British Columbia Electric Railway for Homes

Considerable progress is reported on the plan of the British Columbia Electric Railway, Vancouver, B. C., to assist its office employees to acquire homes. As explained in the ELECTRIC RAILWAY JOURNAL for April 26, page 835, the plan had its inception in the fact being brought to the attention of the general manager of the railway that a number of the office employees had had the houses in which they lived sold over their heads by owners and had experienced great difficulty in finding other houses at reasonable rents.

The company decided to set aside $50,000 to be loaned at 6 per cent interest for the purpose of assisting its office employees to acquire their own homes. The details of the scheme were left in the hands of the Office Employees' Association through a committee elected by the members of that associations. A scale of repayments was arranged which provided for the loan, with interest, being repayable over a term of twelve years, the maximum amount to be loaned to any one employee being $2,500.

### APPLICATIONS TOTAL $160,000

Out of approximately 250 office employees on the company's staff, there have been applications from eighty employees for amounts totaling $160,000. A selection has been made of twenty-five cases which are considered to be most equitable. These will absorb the $50,000 that has been set aside.

The first cases which have been handled are purchases of houses already built and the scheme promises to work quite satisfactorily. The committee of employees goes very thoroughly into the details of each case before putting it forward to the company for a loan to be made. The company has the property valued before finally passing upon the loan. The applicant is required to produce cash or other security equal to 10 per cent of the amount of the loan. The services of the company's legal and other departments are free.

In allotting the loan, the length of service of the applicant with the company, the number of members in his family and all other circumstances are taken into consideration, as well as his ability to furnish a proportion of the cost of the house.

All questions arising under the rules or in connection with the scheme are subject to the final decision of the general manager.

# Public Relations Greatly Improved

## Quick Results Follow Full Publicity Regarding Affairs of the Birmingham Railway, Light & Power Company

After five months of publicity work relations between the Birmingham Railway, Light & Power Company, Birmingham, Ala., and its patrons are cordial and the company is improving its service with the public co-operating and receiving the benefit. In fact, the results obtained are almost startling in the rapidity with which an extremely hostile public sentiment, countenancing even open violence and destruction of property, was overcome and converted to a spirit of co-operation.

### DEMONSTRATION AGAINST COMPANY

An effective method of dealing with a public which had stoned several cars, attacked at least one car in mob formation, and through a civic organization was demanding of the City Commission the revocation of the company's franchises was the problem the company had to meet when its publicity campaign was decided upon and put into execution.

J. S. Pevear, as president of the company, decided upon and instituted the publicity campaign. When the company went into the hands of Lee C. Bradley as receiver, in January, Mr. Bradley, as was explained in the ELECTRIC RAILWAY JOURNAL at the time, not only continued the publicity work started by Mr. Pevear, but widened its scope. In charge of the campaign as director of publicity has been John Sparrow, for years a newspaper man and later an advertising man of Birmingham.

### WAR TOLL LARGE

The Birmingham Railway, Light & Power Company was seriously affected by the war. It suffered a loss of 137 men in its operating department. In addition to the fact that it could not get the men because of the great amount of war work, there was a further and equally serious reduction in the effective operating force due to the epidemic of influenza. The war-time demands for material and machinery had prevented proper repairs and maintenance of cars and a considerable amount of rolling stock was out of repair.

All of the foregoing causes resulted in poor schedules. Cars broke down. The crowds waited for a car to get home. The car finally came and then in many instances it broke down. In spite of the fact that other cities were having similar troubles there was a growing hostility to the company.

### SERVICE BREAKDOWN ON HOLIDAY

What has since been termed as the reign of terror came on with the Christmas season. An average schedule and average service was being maintained, but the system could not meet the heavy addition to traffic caused by the holidays.

Then it was that several cars were stoned. Windows were broken and the cars were otherwise damaged. One suburban car was attacked by a mob, which forced passengers to alight and then attempted to throw the car from the rails and overturn it. All cars were crowded above capacity and frequently all passengers who were standing would refuse to pay fares and rode free. In these cases conductors rarely made any effort to collect fares from those standing. The public utilities committee of the Civic Association took a hand, calling on the City Commission to act. President Pevear and other officials of the company were repeatedly arrested and fined in Recorder's Court for alleged failure to furnish proper service.

### PUBLICITY CAMPAIGN STARTED IN JANUARY

At this juncture early in January the publicity work was started. The company did not take a defensive attitude, but began a campaign of informative advertising. The first advertisements and reading matter appeared in the local papers on Jan. 15. They set out the conditions which the company faced and the steps that were being taken to remedy matters. As more men were secured reports were published showing the additions to the operating force. At frequent intervals statistical reports were published showing the number of cars operated and the gain over the period just passed. News was immediately made public by the company as it developed and the advertising all tended to show a sincere effort on the part of the company to establish again and maintain good service.

This publicity, which included both advertisements and news matter, bore speedy results. Threats of violence against the company and its property and against President Pevear, which had been very common, subsided. There was an improvement in the attitude of passengers. They waited for their cars, and if they stood, owing to crowded conditions, most of them stood cheerfully.

### BACK TO NORMAL AGAIN

Now, five months after the campaign was started, a very good schedule is being maintained. The operating force has been recruited to the strength necessary to furnish adequate service. Cars are being repaired and renovated, repainted and put into good operating condition. The tracks are being rehabilitated and a large amount of new rail, heavier than the old, is being laid. The public has been acquainted with all of the facts in the case and with all details of the work as rehabilitation of the system has progressed.

In discussing the matter with the representative of the ELECTRIC RAILWAY JOURNAL at Birmingham, Mr. Sparrow, the director of publicity in the campaign, said:

> The company adopted an open and aboveboard policy. The officers took the people into their confidence and placed all their cards on the table. All of the advertising was of a strictly informative nature. Any citizen could secure any information he wanted from me. The public was shown that the company was doing its best under adverse circumstances. Public sentiment showed an almost immediate improvement. The campaign appealed to the spirit of fair play and sportsmanship of the public and wonderful results were secured.

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# Union Contract Unenforcible

## Strike on Pennsylvania Property Demonstrates Inability of Amalgamated to Force Compliance

The strike of the employees of the Schuykill Railway, Girardville, Pa., to which a very brief reference has been made previously in the ELECTRIC RAILWAY JOURNAL, was brought to a close on May 6, the men returning to work after the general manager had met them in a body and talked to them at length. The situation in Girardville had assumed a very serious aspect in that the Amalgamated Association publicly confessed that it was unable to enforce the provisions of its contract and had to abandon the situation without any hope of finding a solution. The company and its employees left to themselves arrived at a solution in an entirely amicable manner.

### CONTRACT PROVES SCRAP OF PAPER

The strike situation revolved around the contract made by the Schulykill Railway with its men and the Amalgamated Association in July, 1918. This contract was to continue until Aug. 1, 1919. Under the terms of the agreement the company was to pay its men 33 and 35 cents an hour. The contract provided that either party desiring a change or modification should notify the other in writing thirty days before the expiration of the agreement. During the life of the agreement or any extension of it the company was not to suspend operations arbitrarily, except for causes beyond its control, and the men were not to strike, cease work or attempt directly or indirectly to hinder or prevent the company from operating. Both sides bound themselves to live up to the "letter and spirit of the contract as a matter of principle, honor and squareness."

Under this contract the wages of the men had been increased 60 per cent over those in force in 1915. The company in the meantime under an order from the Public Service Commission had been forced to return from an 8-cent fare to a 6-cent fare. About Sept. 1, scarcely two months after the contract had been signed, the men demanded a flat increase of 10 cents an hour. The company with its revenues thus decreased refused the demand. The men thereupon appealed to the National War Labor Board. This board on April 17 last dismissed the appeal, holding that it had no jurisdiction in iew of the contract between the men nd the company. The men then de- vered an ultimatum to the company enewing their demand and further in- isting upon the payment of the new cale being made retroactive to the ate set by them originally. This de- hand the company refused. The men ereupon went on strike.

The company promptly notified Pres- lent Mahon of the Amalgamated and alled upon him to replace the men and ve up to the terms of the contract. Ir. Shea of the Amalgamated was sent Girardville and with the committee aited upon the general manager of he railway, at which time the de- and was repeated. The company took e position at this meeting that it ould not deal with either the men or e association while the men were in en defiance of the obligations of their ntract. Mr. Shea thereupon issued public statement declaring that the en had violated their contract and the ws of the association and that he ad suspended them from membership erein. Having issued this statement, left the community.

After the strike became effective but fore the return of the men, the Pub- Service Commission handed down decision permitting the company to arge an 8-cent fare, but requiring it sell seven tickets for 50 cents. With is opportunity for increasing its reve- e, the company promptly offered its en a new wage rate of 35 cents, 38 nts and 40 cents, all of the old men be permitted to return at the high- t rate. The men thereupon agreed return and individually entered into contract with the company at the new tes. This contract is to run for a riod of six months under substan- ally the same terms as the former ntract, with the exceptions as stated eviously.

## New York Mayors to Consider Traction Problems

One entire session of the tenth an- al conference of the city officials of ew York State at Schenectady on ne 10, 11 and 12, will be set aside for nsideration of the electric railway oblem. Mayor Walter R. Stone, pres- ent of the cities' organization, who nounced on May 28 that arrange- ents for this feature of the confer- ce have been completed, is reported have said:

> This is one of the most important prob- ns confronting the cities of the State. equate traction service is of vital im- rtance to every municipality. In many the cities the situation is serious.
>
> Every city administration must prepare elf to solve the problem when presented. have therefore arranged to have pre- ted and discussed all of the plans that ve thus far been suggested to insure ade- te service at reasonable cost.

Dr. Thomas Conway, Jr., professor finance of the University of Penn- lvania; Harlow C. Clark, of the nerican Electric Railway Association; E. Mitten, chairman of the executive nmittee of the Philadelphia Rapid ansit Company, and Delos F. Wilcox, New York, will advise the city officials how they think the problem can be solved.

Among the plans that will be discussed will be increasing the revenues of the electric railways by increasing the fare, service-at-cost plans, private ownership and municipal operation and municipal ownership and operation.

## Wage Increase in Fort Smith

The Fort Smith Light & Traction Company, Fort Smith, Ark., has signed a two-year contract with the men, whereby a 32 per cent increase in wages is granted. The employees had asked a 52 per cent increase.

The company will ask the Corporation Commission of the State and the City Commission for a 6-cent fare, effective as soon as possible.

One-man cars will be used as soon as they can be had.

On some of the lines a fifteen minute service will be provided as soon as the necessary switches can be installed.

The new scale of wages follows: First six months, 33 cents; second six months, 34 cents; second year, 35 cents; third year, 36 cents; fourth year, 37 cents; fifth year and thereafter, 39 cents.

This scale is effective immediately and is without reservation, the company having every confidence in the fairness of the public and its willingness, in view of increased wages and cost of operation, to pay the additional cent fare asked for.

## Municipal Ownership the Alternative

Louis H. Bean, president of the Tacoma Railway & Power Company, Tacoma, Wash., has started what is believed to be propaganda for the sale of the company's railway system to the city, to be operated as a municipal line. Each Councilman has received a letter through the mails, inclosing a pamphlet, "The Street Railway Situation," in which arguments favoring municipal ownership are set forth. The booklet suggests that under present conditions the burden of supporting the system must be borne by patrons of the line, and that this burden can be made less irksome under municipal than private ownership. It is further pointed out that if the city wants the present regime continued, several important steps must be taken for the relief of the company, namely:

> The company must have a complete monopoly of transportation; the city must establish control of vehicular traffic so as to prevent accidents, and give the street cars right of way at all times; all paving and bridge charges must be rescinded; the city should refund the amount the company has paid for bridges and paving of streets, if possible, also the gross earnings taxes; the company should be free to route cars and regulate traffic; there should be a readjustment of fares.

It is intimated that a valuation of $7,500,000 is set on the company's properties.

## Construction Prospects Good

At least three new interurban electric railways will be built out of Dallas, Tex., within the next three years, according to J. F. Strickland, president of the Dallas (Tex.) Railway and the Texas Electric Railway. Mr. Strickland said his company would start work on one of the lines this year. Under the franchises granted the Strickland-Hobson interests covering electric railways, electric lighting and the interurban terminals, at least one line must be begun this year.

Mr. Strickland says three interurban lines: Dallas to Wichita Falls via Denton; Dallas to Greenville, and Dallas to Terrell, are needed now, and that all these lines should yield profitable returns from the beginning of their operation. The Dallas-Wichita Falls line is now projected by other interests than the Strickland-Hobson combine, and it is known that Mr. Strickland and his associates are investigating projects of building lines to Greenville and Terrell.

In a recent address before the Dallas Chamber of Commerce and Manufacturers' Association, Mr. Strickland outlined the history of interurban building in north Texas and gave some interesting statistics regarding the operation of such lines.

## Honolulu Case Merely Presented

Owing to various causes, among which was the lateness of the application of the Honolulu Rapid Transit & Land Company, Honolulu, T. H., for legislation with respect to the problems before the company, it was impossible to do more than present the case to the Senate committee. The matter has therefore to go over for two years more. The company met with opposition regarding the terms desired. There is a public utility commission in Hawaii, but this commission has no jurisdiction at present over rates of fare or any authority to order extensions. The public demanded extensions which could not be built by the company under the terms of the present franchise without rendering it impossible for the company to meet its obligations to its security holders.

The work of educating public opinion to the fundamental stand which the company had taken was begun before the introduction of the new legislation and will undoubtedly be continued pending a full settlement of the matter. The problems before the company were made plain in an article which appeared in the ELECTRIC RAILWAY JOURNAL for March 29, page 660. L. T. Peck, president of the company, has said that it is absolutely necessary that the extended franchise should be flexible enough in its terms as to rates and government charges under commission control that the revenues will always be sufficient to provide the very best of service and a fair return on the capital already invested and on that yet to be sought for immediate and future expansion.

## Twenty-two Cent Wage Increase Asked

The employees of the Tri-City Railway, Davenport, Iowa, have asked for an increase in the wage scale which will total $250,000 annually. The present contract expires in June. The unions are asking for a one-year contract with a maximum of 62 cents an hour. This is an increase of 22 cents over the present maximum of 40 cents. A nine-hour day is also asked for.

The petition comes from 425 men through Davenport, Rock Island and Moline locals of the Amalgamated Association. The present contract has been running for three years. The wages specified in the contract are: 28 cents an hour for the first year, 29 cents an hour for the second year and 33 cents an hour for the third year.

When the war broke out and high wages in other trades began to cut the force the following scale, still paid, was agreed upon: 36 cents an hour for the first year, 38 cents an hour for the second year and 40 cents an hour for the third year.

The union is now asking 58 cents an hour for the first year, 60 cents an hour for the second year and 62 cents an hour for the third year.

The companies affected are the Tri-City Railway of Iowa; Tri-City Railway of Illinois; Moline, Rock Island & Eastern Traction Company and the Clinton, Davenport & Muscatine Railway, an interurban.

The company has stated that for the last nine months passengers have been carried at a loss due to the increase in cost of labor, materials and operation.

## Interurban Employees Strike

Platform employees of the Rochester & Syracuse Railroad, Rochester, N. Y., went on strike on May 16 because of a wrangle between the Amalgamated Association and the Brotherhood of Locomotive Engineers and Order of Railway Conductors. The company is employing Amalgamated motormen and conductors and efforts are being made to maintain service on the interurban lines between Rochester and Syracuse.

The Amalgamated Association's refusal to agree to the operation of cars of the line by brotherhood men within the city of Rochester was back of the company's attempt to induce its employees to join the Amalgamated and do away with the necessity of changing crews at the Rochester city line. The men went on strike rather than abandon the brotherhood organization and the Amalgamated thereupon attempted to furnish men to the company for the temporary operation of its interurban lines.

If the attempt to operate cars entirely by members of the Amalgamated Association wins out the Rochester & Syracuse Railroad will save almost $17,000 a year by eliminating the expense incident to having extra crews meet all cars at the Rochester city line.

There is a feeling that the difficulty may be solved by agreement between the rival unions to permit the employees of the Rochester & Syracuse Railroad to retain the insurance and benefit features of the brotherhood affiliations while permitting the Amalgamated to represent them in dealings with the company.

## News Notes

**Pay Increase in Springfield.**—The Springfield (Ill.) Consolidated Railway has granted an increase of pay to its trainmen from 36 cents to 39 cents an hour.

**Not Satisfied With Electrolysis Protection.**—The City Commission of Trenton, N. J., has notified the Trenton & Mercer County Traction Corporation that the company's present system for the mitigation of electrolysis is unsatisfactory.

**Wage Advance in East Liverpool.**—A wage scale, ranging from 43 to 47 cents an hour, was granted motormen and conductors of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, in an award announced on May 23 by an arbitration board. This is an 11 per cent increase over the 1918 scale.

**Wage Increase in Montreal.**—An arbitration board which considered the demand of the employees of the Montreal (Que.) Tramways for higher wages has recommended that men in receipt of 37 cents an hour be raised to 48 cents and those getting 31 cents be raised to 41 cents. The increases will mean an addition of $650,000 a year to the company's operating expenses. Three thousand five hundred men are affected.

**Opening of Modern Cafeteria at Cleveland.**—The establishment of the dry law in Cleveland on May 26 was preceded by a dinner at the Hollenden on May 23 attended by a number of railway and supply men who wished to mourn the wake (in Ohio) of John Barleycorn. A jazz orchestra made dull moments impossible. The cafeteria service counter constituted a bar over which floated every known kind of schooner—and some unknown. The Dean of the carbuilding industry officiated. Between 130 and 140 mourners sat up with the spirits.

**Wants New Regulatory Legislation.**—Declaring that the present situation as regards regulation of public utility rates in New Jersey is such as to warrant "immediate remedial legislation at a special session of the Legislature," Frank H. Sommer, counsel for the associated municipalities opposing the Public Service Railway's zoning plan and associate counsel with City Attorney Kearns in Mayor Gillen's 1-cent suit against the company, has given out a statement criticising conditions which led to a decision being given in favor of the company by District Court Judge Frederic L. Johnson.

**Minneapolis Terminal Electrification Report.**—Electrification of the railroad terminals at Minneapolis, Minn., suggested as a means to eliminate the smoke nuisance from steam railroad engines, will cost $70,000,000 according to F. W. Cappelen, city engineer, in a report to the City Council. This district would include St. Paul, South St. Paul, Minnesota Transfer and Fridley. The survey necessary to draw plans would cost between $30,000 to $40,000. The Council will continue the investigation, although the engineer believes the railroads are not in a position now to undertake the improvement.

**Proposed National Engineering Board.**—A bill has been introduced into the Senate of the United States authorizing the organization of a National Engineering Board, to be composed of the Secretary of Commerce and the National Research Council. This board will appoint branch state boards of five engineers in each state and territory. These state boards will supervise and control all engineering and industrial investigations of a public nature such as those connected with the water supply, flood protection, etc., and including "transportation of property and persons on land and water, public lighting and heating, the development of power and of processes for the manufacture of materials useful to the people of the United States." The bill carries the authorization of $15,000 for the payment of each of the state boards and of the national board.

## Programs of Meetings

### New York Electric Railway Association

The annual convention of the New York Electric Railway Association will be held at the Fort William Henry Hotel, Lake George, N. Y., on June 7. The program was published last week.

### American Short Line Railroad Association

A convention of the officers of all short line railroads in the United States will be held at the New Willard Hotel, Washington, D. C., on June 3-5. Among the speakers expected are Director-General of Railroads Hines, Senator Cummings, Senator Smith, John E. Esch, chairman of the House Interstate Commerce Committee, DeWitt Cuyler, chairman of the railways executive committee. Invitations to attend this convention are being sent to electric railways which are engaged in the freight business. It is expected that legislation important to short line railroads will be enacted at this session of Congress so an especially large attendance is expected at this meeting.

# Financial and Corporate

## Baltimore's Worst Year

### Revenues Gained 12 Per Cent, but Operating Expenses, Depreciation and Taxes 25 Per Cent

The calendar year 1918, it is said, was in many ways the worst year in the history of the United Railways & Electric Company, Baltimore, Md. The greatest difficulty from a revenue point of view was that wages and the cost of materials were increasing rapidly during the entire year, while the increased revenue from the 6-cent fare was effective during only the last three months of the year.

The gross receipts for 1918 were $11,929,701, an increase of $1,368,864 or 12.96 per cent over 1917. This increase was due to three factors: (1) Increased war activities; (2) increased fare effective during the last three months of the year, and (3) normal increase due to increase of population, riding habit, etc. While there is no satisfactory method of segregating these items, the company believes that the third and most important factor evidenced a satisfactory condition during 1918.

OPERATING RESULTS OF UNITED RAILWAYS & ELECTRIC COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

| | 1918 | 1917 | Increase | Per Cent Increase |
|---|---|---|---|---|
| Operating revenues | $11,929,701 | $10,560,836 | $1,368,864 | 12.96 |
| Operating expenses | $6,839,822 | $5,267,395 | $1,572,427 | 29.85 |
| Depreciation | 596,485 | 528,042 | 68,443 | 12.96 |
| | $7,436,307 | $5,795,437 | $1,640,870 | 28.31 |
| Taxes, licenses, etc. | 1,160,452 | 1,079,723 | 80,729 | 7.48 |
| | $8,596,759 | $6,875,160 | $1,721,599 | 25.04 |
| Ratio of operating expenses to operating revenues: | | | | |
| Operating expenses (percent) | 57.33 | 49.88 | ..... | 7.45 |
| Depreciation (per cent) | 5.00 | 5.00 | ..... | ..... |
| | 62.33 | 54.88 | ..... | 7.45 |
| *Taxes, licenses, etc. (per cent) | 9.73 | 10.22 | ..... | † 0.49 |
| | 72.06 | 65.10 | ..... | 6.96 |

*Decrease caused by transfer to profit and loss of $105,035 of income and excess profits taxes, whereas in 1917 the corresponding amount was included in the item of taxes, licenses, etc., in the income statement.
†Decrease.

### WEATHER AND INFLUENZA AFFECT EARNINGS

On the other hand, the company suffered during the first few months of the year from the worst weather conditions that it has ever experienced. Traffic was interrupted and for brief periods completely shut down by snow and ice conditions and, in common with transportation companies everywhere, there was a rapid falling-off in receipts. In October, when considerable relief was expected from the increased fare, the influenza epidemic resulted in the closing down of all theaters and schools and the avoidance, so far as possible, of contact on street cars by the public. The receipts for October and for some little time thereafter were materially below what might otherwise have been expected.

The increase in operating expenses of $1,572,427 or 29.8 per cent was mainly reflected in the cost of conducting transportation. Although the largest increase of wages did not take place until September, the cost of conducting transportation, at $3,518,310, showed an increase of $884,470 or 33.5 per cent. The cost of maintenance of way and structures and equipment aggregated $1,300,879 in 1918, an increase of $377,239 or 40.8 per cent over 1917. The amounts charged to depreciation were increased $68,444 or 12.9 per cent to a total of $596,485. The cost of power at $1,040,158 represented an advance of $189,169 or 22.2 per cent.

The total taxes and public charges in 1918, including the park tax, cost of paving streets, etc., was $1,344,408, or more than 26 per cent of the net receipts after operating expenses. This represented an increase of $186,485 over 1917 and an increase of $271,629 over 1916. The park tax for the year was $755,467, an increase of $83,755. The total amount paid to the city of Baltimore in park taxes alone, since the consolidation of the various electric railway lines in 1899, aggregates $9,398,217.

The gross income of the United Railways & Electric Company in 1918 amounted to $3,416,003, and deductions from income to $3,083,351. This left a net income of $332,652 subject to federal taxes. The company continued its dividend policy, $486,715 of surplus being drawn upon. In addition, special demands, such as contributions incident to war, amounting to $35,574, and income and excess profits taxes for 1917, amounting to $105,035, were charged against surplus, resulting in a reduction of the item of surpluses to $362,370 on Dec. 31, 1918, as compared to the sum of $1,066,987 the year before.

## Boston Deficit Grows

### April Returns Show a Loss of $316,392 as Compared to $224,920 in March —Repair Charges Bulk Larger

The financial report for April, made public by the trustees of the Boston (Mass.) Elevated Railway, shows a deficit of $316,392 for the month. This compares with deficits of $224,920 in March, $285,124 in February and $219,269 in January. One of the reasons for the larger deficit in April was the excess of track and car repair work above a fair monthly average.

### COST PER PASSENGER 9.328 CENTS

The total receipts from all sources for April were $2,386,822. Of this amount $2,309,079 was received from fares. The total cost of service was $2,703,214, of which $1,218,796 was expended for wages. The cost of labor per revenue passenger was 4.203 cents.

The total cost of service per passenger for April was 9.328 cents, as compared with 8.923 cents in March, 9.304 cents in February, 8.970 cents in January and 9 cents for the ten months ended April 30, 1919. The receipts under the 8-cent fare in April, 1919, as compared with the 5-cent fare in April, 1918, showed an increase of $727,170, or 45.96 per cent as compared to 42.32 per cent in March, 44.91 per cent in February, and 43.77 per cent in January.

RECEIPTS AND COST OF SERVICE OF THE BOSTON ELEVATED RAILWAY FOR APRIL, 1919

| | |
|---|---|
| Receipts: | |
| From fares | $2,309,070 |
| From operation of special cars, mail pouch service, express and service cars | 7,453 |
| From advertising in cars, on transfers, privileges at stations, etc. | 24,563 |
| From other railway companies for their use of tracks and facilities | 4,260 |
| From rent of buildings and other property | 8,342 |
| From sale of power and other revenue, (including coal sold, $6,721) | 15,239 |
| Total receipts from direct operation of the road | $2,368,937 |
| Interest on deposits, income from securities, etc. | 17,885 |
| Total receipts | $2,386,822 |
| Cost of service: | |
| Maintaining track, line equipment and buildings | $415,436 |
| Maintaining cars, shop equipment, etc. | 234,854 |
| Power (including 24,396 tons of coal at $5.71 or $139,381) | 211,663 |
| Depreciation | 167,000 |
| Transportation expenses (including wages of car employees, carhouse expenses, etc.) | 804,755 |
| Salaries of administrative officers | 7,583 |
| Law expenses, injuries and damages, and insurance | 100,566 |
| Other general expenses | 72,043 |
| Total operating expenses (of which $1,218,796 represents wages) | $2,013,900 |
| Taxes, proportion | 88,179 |
| Rent for leased roads (exclusive of subways) | 215,785 |
| Proportion of rent of subways and tunnels to be paid to the City of Boston (exclusive of Cambridge Subway owned by company) | 125,645 |
| Interest on Boston Elevated bonds and notes | 131,418 |
| Miscellaneous items | 8,693 |
| Proportion of dividends under acts of 1918 | 116,998 |
| Interest on unpaid taxes | 2,596 |
| Total cost of service | $2,703,214 |
| Net loss | $316,329 |

# Merger Agreement Modified

## Indianapolis Plans Simplification of Corporate Structure Following Order of Public Service Commission

The committee of fifteen stockholders of the Indianapolis (Ind.) Street Railway, which was appointed at a stockholders' meeting some time ago to prepare a plan in keeping with the order of the Public Service Commission calling for a reduction of fixed charges and for expending in improvements the amounts paid into the sinking funds, held a meeting on May 21 and approved certain modifications in the proposed agreement for a merger of their company and the Indianapolis Traction & Terminal Company.

### DIRECTORS AND COMMITTEE APPROVE PLAN

This agreement was approved by the board of directors of both companies on May 19. Following this approval by the directors, and the committee of fifteen, the proposed agreement was submitted informally to members of the Public Service Commission, and sent to the stockholders who are to meet on June 2. If approved by the stockholders, the matter will then be subject to the final approval of the Public Service Commission and the city of Indianapolis. When the proposed agreement was presented informally to the Public Service Commission, it was requested that the 5-cent fare order of the commission be continued and that the charge to the various interurban companies for use of the tracks and terminals in the city of Indianapolis be increased from 4 cents to 6 cents a passenger.

### FARE CASE REVIEWED

In the report to the stockholders of the Indianapolis Street Railway the committee recites the petition of the Indianapolis Traction & Terminal Company for increased fares. This was filed in November, 1917, and, on account of legal interferences, the hearing of this matter did not come up until August, 1918. Upon this hearing, it developed that the company had been operating for a considerable period at a heavy loss, and in October, 1918, the commission entered an order temporarily fixing a 5-cent fare, which, with other changes, it was thought by the commission, would produce an additional income of $500,000. In this same case, however, the commission ordered wage increases which absorbed approximately $375,000 of the increase granted. An attempt to secure a further increase in fare was denied by the commission in December, 1918.

### INTEREST PAYMENT POSTPONED

On Jan. 1, the company postponed payment of the bond interest on the Indianapolis Street Railway bonds, and on April 1, the interest on the Indianapolis Traction & Terminal Company bonds. The report also states that for several years the company has been aided in meeting other obligations by the postponement of the payment for power furnished by the Terre Haute, Indianapolis & Eastern Traction Company, which, to May 1, 1919, amounted to approximately $718,000.

As arguments against any separation of the properties, the report states that it would be difficult to determine just what property would belong to each company, as the Indianapolis Traction & Terminal Company has added a great amount of property since the execution of the lease, and the street railway could not continue operations without the use of some of this property. The present stockholders of the street railway are investors and not operators, and to change into a working organization prepared to operate and finance the property is regarded as very difficult.

### PLANS FOR NEW COMPANY

The proposed agreement for consolidation provides that the reorganized company shall issue $5,000,000 of preferred stock and $2,500,000 of common stock, and that each shall have equal voting rights. The $2,500,000 of common stock is to be exchanged for the $5,000,000 of stock of the Indianapolis Traction & Terminal Company on the basis of one share of the consolidated company for each two shares of the terminal company. The $5,000,000 of preferred stock of the consolidated company is to be exchanged share for share for the $5,000,000 of common stock of the Indianapolis Street Railway, which at present is guaranteed a dividend of 6 per cent as rental by the Indianapolis Traction & Terminal Company. Under the new consolidation, this preferred stock will carry a 6 per cent cumulative dividend, and this dividend will not be paid unless earned by the company.

### LIMIT TO BOND ISSUES

The agreement provides further that not more than $15,000,000 of bonds can be outstanding at any time during the existence of the present franchise, which expires in 1933. The bond issues which it is proposed to absorb are $6,000,000 of the Indianapolis Street Railway and $4,000,000 of the Citizens' Street Railroad, and a $5,000,000 issue of the Indianapolis Traction & Terminal Company. Bonds amounting to approximately $2,200,000 have been retired by payments of $120,000 annually into sinking funds in addition to the interest on bonds which are kept alive in the sinking funds, and it is proposed that these retired bonds shall be reissued for the purpose of making extensions and other improvements to the system from time to time. Provisions for sinking fund fixed payments will be retained, but an effort will be made to discontinue paying interest on bonds already in the sinking fund.

The Public Service Commission stated that the agreement would be very carefully considered, and until it had been studied, the commission would express no opinion in regard to same. The city of Indianapolis desires the company to make certain extensions of lines, which will probably be considered in any agreement entered into between the Public Service Commission or the city and the street railway.

## Standard Gas & Electric in Oil

H. M. Byllesby, president of the Standard Gas & Electric Company, Chicago, announces the completion of the consolidation of his company with oil and refining interests heretofore known as the C. B. Shaffer interests. The consolidation will result in the formation of a new company to be known as the Shaffer Oil & Refining Company, of which C. B. Shaffer will be president. His entire staff will remain with the new organization. Mr. Byllesby becomes chairman of the board of the new company and Mr. Shaffer becomes a director of the Standard Gas & Electric Company. A statement says:

> The Shaffer interests have for years operated entirely independently and constitute the one remaining large independent complete oil property that has not heretofore been consolidated with other interests.
>
> The new company starts with large cash resources and will adopt an extremely progressive program.
>
> The Standard Gas & Electric Company in the consolidation obtains a majority interest in the new company.

### PREFERRED DIVIDEND INCREASED

The directors of the Standard Gas & Electric Company have replaced the preferred stock on an 8 per cent annual basis by declaring a quarterly dividend of 2 per cent. The preferred has been paying 6 per cent annually. The following official statement has been issued:

> The company announces that this is to be its future regular dividend policy. The dividend is paid from earnings of the company for the last quarter entirely irrespective of the large earnings of the Shaffer Oil & Refining Company interests which accrue to the Standard Gas & Electric Company from Jan. 1 of this year.
>
> In view of the completion of acquirement of the Shaffer properties and the further large increase in Standard Gas & Electric Company's earnings, President Byllesby appointed a committee to report at an early date upon a plan for liquidation of unpaid accumulated dividends on the Standard preferred stock amounting to approximately 13 per cent.

The Standard Gas & Electric Company has acquired the engineering and management organization of H. M. Byllesby & Company. The engineering and management force will be used by the Standard in its new program of expansion in its gas and electric properties. A new corporation is to be formed, it is understood, embracing in this management organization all of the stock to be owned by the Standard Gas & Electric Company.

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As noted elsewhere in this issue a syndicate of bankers is offering for subscription $12,000,000 of Shaffer Oil & Refining Company first mortgage 6 per cent convertible bonds.

## Compromise Valuation

### Minneapolis Street Railway Makes Offer in Hope of Bringing About Speedy Franchise Settlement

The street railway committee of the Council of Minneapolis, Minn., is considering a valuation offer by the Minneapolis Street Railway, which is about 3 per cent above the city's figure. The sum is $23,232,018 as of Jan. 1, 1919, for all property inventoried by the city, exclusive of the Lake Harriet right-of-way, which is not on city streets. The offer is one of the steps under way to get a base for determination of the terms of a proposed new franchise for the company. The city's figure was $23,533,150 as of Jan. 1, 1916.

In forwarding the offer of the directors of the railway Horace Lowry, the president, wrote:

> In view of the acute situation now existing the company is at this time willing to make a compromise in order to bring about a prompt settlement of the whole problem, but we wish it understood that unless an agreement is now reached the company will have to withdraw the following offer, and in that case it will in the future be governed by conditions then existing.
>
> The city's offer of $22,533,150, as of Jan. 1, 1916, is lower than it is possible for the company to accept, and therefore the directors have decided to make the city a flat offer of value as of Jan. 1, 1919, as follows:

| | |
|---|---|
| Value as of Jan. 1, 1919, of property inventoried by the city as of Jan. 1, 1916, (excluding the Harriet right-of-way) .. | $23,232,018 |
| Value as of Jan. 1, 1919, of the Columbia Heights and Fort Snelling lines outside of the city (not included in city's offer) . | 142,044 |
| Net additions to and withdrawals from the property from Jan. 1, 1916, to Jan. 1, 1919 (subject to verification by the city)................................ | 1,125,938 |
| Total value as of Jan. 1, 1919........... | $24,500,000 |

> On this valuation we are to be allowed to earn 7 per cent a year, which is a lower rate of return than the company was compelled to pay in its recent refinancing of $5,000,000 of its bonds.
>
> Should your honorable body accept the above and embody it in a modern cost-of-service franchise which the electors ratify, it would be possible for us to re-establish the former high standards of service and provide such extensions as you deem needed at this time.

The discussion at Minneapolis has extended over many months, with the valuation material coming piecemeal. For that reason it is deemed advisable to reprint the various valuation figures as recently summarized for the benefit of local Minneapolis people:

| | |
|---|---|
| BY THE CITY | |
| F. W. Cappelen, city engineer........... | $25,914,308 |
| C.L. Pillsbury, for city................... | 24,300,000 |
| BY THE COMPANY | |
| Original maximum claim................ | $35,323,376 |
| Original claim on physical property to reproduce.............................. | 28,717,033 |
| Compromise figure just submitted....... | 23,232,018 |
| UNOFFICIAL ESTIMATES | |
| Central Franchise committee, (majority) | $22,156,951 |
| Central Franchise committee, (minority) | 15,470,360 |
| Hogarth-Van Lear recheck and reappraisal on physical items of Cappelen report.................................. | 13,608,730 |

The figure of $23,232,018, as explained previously, does not include the Harriet private right-of-way. The Cappelen and Pillsbury valuations do include this item. It is pointed out that in order to put all the valuations on the same basis, the sum of $632,000—the value of the Harriet right-of-way—must be subtracted from the Cappelen and Pillsbury figures and $142,044 added to the figure of each for the Columbia Heights and Snelling lines and $1,125,938 for net additions and withdrawals since their figures were made. The official figures, thus reduced to a common footing are:

| | |
|---|---|
| Company's minimum, excluding Harriet right-of-way and including Columbia Heights and Snelling lines and net additions and withdrawals since Jan. 1, 1916................................. | $24,500,000 |
| Cappelen figures on same basis.......... | 26,560,290 |
| Pillsbury figures on same basis.......... | 24,935,98 2 |

## Receivership If Interest Is Not Waived

The management of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has sent circular letters to the owners of the corporation's first mortgage 5 per cent bonds acquainting them with the desperate financial condition of the property and asking them to accept interest-bearing notes for a period of three years in lieu of the payment in cash of the coupons as they mature during the interval. The company has also asked the bondholders to waive the operation of the sinking fund until 1925. This is the only alternative to receivership, according to the announcement.

It is imperative that the sum of $400,000 be raised during the next few years in order to rehabilitate the property as ordered by the Public Service Commission of Georgia and to liquidate floating indebtedness, and as the corporation has no other way to obtain funds the bondholders are called upon to forego payment of interest in cash on the securities they own of the company.

The management says that the saving in interest and waiving of the sinking-fund provision will provide the sum needed and a considerable portion of the cash for the redemption of the notes at maturity.

Accompanying the letter is a form of agreement bondholders are asked to sign and return with their bonds to the Central Union Trust Company, New York.

## Would Settle Power Debt with Notes

A proposed agreement of the Indianapolis Traction & Terminal Company, Indianapolis (Ind.) Street Railway and Terre Haute, Indianapolis & Eastern Traction Company in regard to a $700,000 debt for power due the Terre Haute, Indianapolis & Eastern from the Indianapolis Traction & Terminal Company, and for further supplying power, has been submitted to the Public Service Commission, together with a letter explaining the agreement and asking for approval.

The agreement is to be carried out in the event of a consolidation of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company. Because the notes the Indianapolis Traction & Terminal Company is to give will run for more than one year, the approval of the Public Service Commission is said to be required. The proceeding is in view of the meeting of stockholders of the Indianapolis Street Railway on June 2, to vote on a proposed consolidation.

The proposed agreement as to debt for power and for power to be supplied in the future, if a consolidated company is formed, is signed by the officials of the three companies concerned. In addition to providing that fourteen promissory notes of $50,000 each shall be given for the $700,000 power debt, which is to draw 4 per cent interest, beginning May 28, 1921, it is provided that the contract for power between the Indianapolis Traction & Terminal Company and the Terre Haute, Indianapolis & Eastern Traction Company shall continue with the proposed consolidated company until April 7, 1933, the termination of the franchise, except that the question of price shall be readjusted July 1, 1922, and July 1, 1927.

If the proposed consolidated company and the Terre Haute, Indianapolis & Eastern Traction Company cannot agree as to price at the readjustment times, it is provided that each shall appoint an arbitrator. If the two arbitrators cannot agree they shall select a third, and the decision of the three shall be final.

## Financial News Notes

**Offers Grand Rapids Bonds.**—Harris Forbes & Company, New York, N. Y., are offering for subscription at 96.86 and interest yielding 6.75 per cent $1,500,000 of first mortgage 6 per cent five-year gold bonds of the Grand Rapids (Mich.) Railway.

**Receivers Made Permanent.**—Judge Sandford of the Federal Court at Knoxville has handed down an order making Percy Warner, Nashville, and John S. Graham, Philadelphia, permanent receivers of the Chattanooga Railway & Light Company. The receivership covers only the railway and not the light department of the company.

**Mr. Eccles After Linnton Road.**—D. C. Eccles, Ogden, Utah, who is interested in the Utah-Idaho Central Railroad, is negotiating for the purchase of the United Railways, operating from Linnton, a Portland suburb, to a tract of timber land some 12 miles out, which is owned by the Oregon Lumber Company, of which Mr. Eccles is a stockholder.

**Atlanta Notes Offered.**—Edward B. Smith & Company, Philadelphia, Pa., are offering $2,500,000 two and one-half year 6 per cent secured notes of the Georgia Railway & Power Company, Atlanta, Ga., at 99½ and interest to yield 7.05 per cent. These notes, while issued in 1917 on account of additional hydroelectric developments, are only now offered for sale.

**Tax Valuations Increased.**—The Corporation Commission of Oklahoma has fixed assessment valuations for taxation purposes of a number of public service corporations of the State of Oklahoma, including a number of interurban and city railway lines. In most cases there has been an advance ranging from 25 per cent to 33 1-3 per cent over the valuations fixed last year.

**First Mortgage Ten-Year Bonds.**—P. W. Brooks & Company, New York, N. Y., are offering at 96 and interest $950,000 of first mortgage ten-year 6 per cent gold bonds of the Southern New York Power & Railway Corporation, Cooperstown, N. Y. The bonds are dated April 1, 1918, and are due in 1928. They are followed by $500,000 of 7 per cent cumulative preferred stock and $774,900 of common stock.

**New Trustee Under New Orleans Mortgage.**—The Hibernia Bank & Trust Company, New Orleans, La., has resigned as trustee under the refunding and general lien 5 per cent gold mortgage of the New Orleans Railway & Light Company, New Orleans, La., dated Dec. 6, 1909, and the Empire Trust Company has been appointed acting as successor trustee under said mortgage and supplemental mortgage. dated Nov. 1, 1909, and under the supplemental mortgage of the company,

**Must Present Bonds for Indorsement.**—In accordance with the terms of supplemental trust deed dated Dec. 31, 1918, as approved by the resolutions passed at the meeting of the first mortgage fifty-year bondholders of the Barcelona Traction, Light & Power Company, Ltd., on Dec. 19, 1918, the bondholders are requested to produce their bonds at the offices of the company in Toronto, Ont., or London, England, for the purpose of having indorsed thereon a memorandum modifying the rights of the bondholders and of the supplemental trust deed executed in pursuance of such resolutions.

**Easy Tax Payments Proposed.**—The city attorney of Buffalo, N. Y., has suggested a plan to the City Council whereby the International Railway will be able to pay its back taxes amounting to almost $300,000 in five installments. The property of the company was advertised to be sold at a public tax sale on May 28, 1919. The installments would be paid at the rate of $71,000 on May 28; $50,000 on June 30; $25,000, July 31; $150,000, Aug. 31, and the balance Sept. 30. The small amount is promised by the company in July because at that time the company must pay back wages to its employees.

**Note Issue Pays for Power Plant.**—Halsey Stuart & Company, Chicago and New York, are offering at par and interest three-year 7 per cent collateral gold notes of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich. The notes are secured by pledge of first mortgage 5 per cent gold bonds in the ratio of $133⅓ par value of bonds for each $100 par value of notes outstanding. The bonds pledged are secured by a first mortgage on all the property. The present issue of notes totals $294,000. The proceeds of the new issue will reimburse the company for expenditures made in building the Superior Falls water-power plant.

**Oil Bonds Offered.**—Montgomery & Company, Philadelphia, Pa., and Bonbright & Company and H. M. Byllesby & Company, New York, N. Y., are offering for subscription at 95 and interest $12,000,000 of Shaffer Oil & Refining Company first mortgage convertible 6 per cent sinking fund gold bonds dated June 1, 1919, and due June 1, 1929. The bonds are convertible at par into participating preferred 7 per cent cumulative stock of the Shaffer Oil & Refining Company at 105. They are unconditionally guaranteed by the Standard Gas & Electric Company. The Shaffer Oil & Refining Company will acquire the oil interests of C. B. Shaffer and associates in the mid-continent field, as referred to elsewhere in this issue.

**Another City Seeks Valuation.**—The city of Alameda, Cal., following the example set by its neighboring cities—Oakland and Berkeley—has applied to the California Railroad Commission for a valuation of the properties of the San Francisco-Oakland Terminal Railways operating in the city of Alameda. The application is in connection with the company's appeal for a resettlement franchise, and the tentative plans of the east bay cities based on a determination to take over the properties of the railway upon the expiration of the present franchise provided the communities determine to do so. The valuation is required by the city charter of Alameda, and, in accordance with a stipulation filed by the railway, is to be of the date of May 1, 1917.

**Payment for Cars Authorized.**—The New Jersey Board of Public Utility Commissioners has approved of a chattel mortgage to secure a note of the Trenton & Mercer County Traction Corporation, Trenton, to the American Car Company for twenty one-man safety cars and at the same time revoked a certificate issued by the board on Mar. 6 last approving an issue of $121,000 of 6 per cent car trust certificates in part payment for the cars. The certificates have not been issued and the plan of a chattel mortgage and note has been substituted as a means of insuring payment for the cars. The board also rules that should it later appear that it is desired by the parties involved to cancel the chattel mortgage and issue the car trust certificates, application may be made to the board for approval of the issue.

## Electric Railway Monthly Earnings

### ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $12,198 | $10,644 | $1,554 | $342 | $1,212 |
| 1m., Mar., '18 | 13,036 | 9,868 | 3,168 | 494 | 2,674 |

### AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $197,567 | *$161,731 | $35,836 | $39,205 | †$3,369 |
| 1m., Mar., '18 | 168,693 | *138,511 | 30,182 | 36,093 | †5,911 |
| 3m., Mar., '19 | 563,585 | *481,359 | 82,226 | 116,827 | †34,601 |
| 3m., Mar., '18 | 439,408 | *410,158 | 29,250 | 107,399 | †78,149 |

### CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $146,116 | *$115,800 | $30,316 | $21,771 | $8,545 |
| 1m., Mar., '18 | 151,533 | *112,174 | 39,359 | 30,747 | 8,612 |
| 12m., Mar., '19 | 1,854,044 | *1,450,521 | 403,523 | 276,874 | 126,649 |
| 12m., Mar., '18 | 1,467,675 | *1,249,296 | 218,379 | 362,665 | †144,286 |

### COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $2,073,565 | *$1,314,376 | $759,189 | $540,083 | $219,106 |
| 1m., Mar., '18 | 1,756,688 | *1,176,802 | 579,886 | 488,934 | 90,952 |
| 12m., Mar., '19 | 23,101,251 | *15,293,337 | 7,807,914 | 6,210,565 | 1,597,349 |
| 12m., Mar., '18 | 20,093,014 | *13,099,519 | 6,993,585 | 5,440,473 | 1,553,112 |

### CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $202,919 | *$156,083 | $46,836 | $56,434 | †$9,598 |
| 1m., Mar., '18 | 245,270 | *179,104 | 66,166 | 73,881 | †7,715 |
| 12m., Mar., '19 | 3,156,626 | *2,177,275 | 979,351 | 813,436 | 165,915 |
| 12m., Mar., '18 | 3,077,458 | *2,139,882 | 937,576 | 836,718 | 100,858 |

### EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $369,786 | *$262,672 | $107,114 | $69,545 | $37,569 |
| 1m., Mar., '18 | 328,221 | *250,282 | 77,939 | 67,281 | 10,658 |
| 12m., Mar., '19 | 4,351,502 | *3,405,076 | 946,426 | 822,133 | 124,293 |
| 12m., Mar., '18 | 3,783,627 | *2,668,891 | 1,114,736 | 792,345 | 322,391 |

### GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $253,387 | *$189,323 | $64,064 | $33,537 | $30,527 |
| 1m., Mar., '18 | 215,591 | *139,579 | 76,012 | 28,476 | 47,536 |
| 12m., Mar., '19 | 2,817,764 | *2,002,774 | 814,990 | 357,943 | 457,047 |
| 12m., Mar., '18 | 2,210,888 | *1,452,073 | 758,815 | 336,996 | 421,819 |

### HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $29,429 | *$17,744 | $11,685 | $5,956 | $5,729 |
| 1m., Mar., '18 | 31,834 | *17,356 | 14,478 | 6,018 | 8,460 |
| 12m., Mar., '19 | 311,553 | *212,470 | 99,083 | 73,450 | 25,633 |
| 12m., Mar., '18 | 346,535 | *217,564 | 128,971 | 73,877 | 55,094 |

### PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $2,909.270 | *$1,936,255 | $973,015 | $820,090 | †$199,487 |
| 1m., Apr., '18 | 2,588,151 | *1,648,095 | 940,056 | 800,533 | †193,462 |
| 4m., Apr., '19 | 11,126,351 | *7,818,631 | 3,307,720 | 3,238,155 | †258,251 |
| 4m., Apr., '18 | 9,814,091 | *6,371,665 | 3,442,426 | 3,202,051 | †456,375 |

### PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $736,167 | ‡*$441,977 | $294,190 | $186,152 | $108,038 |
| 1m., Mar., '18 | 621,145 | ‡*372,058 | 249,087 | 178,148 | 70,939 |
| 12m., Mar., '19 | 8,005,241 | ‡*5,369,294 | 2,635,947 | 2,240,505 | 395,442 |
| 12m., Mar., '18 | 6,387,407 | ‡*3,855,196 | 2,532,211 | 2,139,509 | 392,702 |

* Includes taxes. † Deficit. ‡ Includes non-operating income.

‡ In March, 1919, $22,085; March, 1918, $18,732; twelve months, 1919, $549,363; twelve months, 1918, $234,320, included for depreciation.

# Traffic and Transportation

## In a Sad Plight

### Subsidy Essential if Berkshire Street Railway Is to Resume Service on Abandoned Lines

The Berkshire Street Railway has officially notified Mayor William C. Moulton of Pittsfield, Mass., it can do practically nothing this year toward its share of the cost of the paving, amounting to about $60,000, and that even with increased fares that went into effect last November is barely meeting operating expenses, to say nothing of city and town tax levies of between $60,000 and $70,000 and interest of $75,000 on bonds issued before these properties were acquired by the present owner, the New York, New Haven & Hartford Railroad.

The payroll at the present time is between $1,400 and $1,500 a day. The men are seeking a 33 per cent increase. If granted this would mean an additional expense of between $500 and $600 a day or about $187,000 a year. The new fare schedule which went into effect last November raised the gross revenue to substantially what it was before the war, but it has not made up for the 28 per cent wage increase granted the first of last June and 10 per cent the year previous and it does not make up for the enormous increase in cost of materials.

### Fare Unit Unchanged

The Berkshire Street Railway did not increase the unit of fare last fall. That unit has remained at 5 cents throughout. As C. O. Richmond, the general manager of the railway, puts it:

> There is a certain psychology in the nickel, which most everybody regards as the proper and just fare for a ride on a trolley car. We believe from the experience of other cities that if the unit is raised, say in Pittsfield and North Adams, it would set more people to walking and the company would actually gain nothing. We believe that keeping the unit a nickel and shortening the zones has been most satisfactory and fair to the traveling public.

So desperate is the case of the company that a conference was held at Springfield with L. S. Storrs, president of the Connecticut Company, owning the line, to discuss its future. Attention was given more particularly at one of the sessions to the matter of branches on which service was abandoned some time ago and which local interests are seeking to have resume now that summer is close at hand. Mr. Storrs said in part:

> In order to enable the Berkshire Street Railway to continue operation of cars through the most populous portion of the territory which it serves it has been necessary to discontinue service over those portions of its lines that have not developed sufficient income to meet the actual costs of doing business, leaving out of consideration all question of paying any return whatever upon the cash invested in the construction of the property. This entire investment has been appropriated to the public uses and all the energy and ingenuity of the officials and employees has been devoted to an effort to give to the public as efficient a service as could be produced with the use of every cent obtained on the cars.
>
> This has not been merely a policy, but an absolute necessity, and in carrying it out the operation between Lee and Huntington has had to be discontinued, as has that between Lanesboro and Cheshire, in which case the tracks have been torn up and the line permanently abandoned. On the line south from Great Barrington the loss was so marked that it was intended to discontinue that service also, and this would have been done had not the towns made an appropriation of an amount sufficient to cover all loss from operation.
>
> In connection with the specific case which we have gathered to discuss, operations were conducted over this line for two seasons, during the first year upon a schedule proposed by the company which did not seem to meet the approval of the communities; during the second season the service was operated upon a plan proposed by representatives of Lee, Huntington and Mr. Eastman of the Public Service Commission.
>
> ### Plea for a Subsidy
>
> Not enough interest was evidenced by the public in this operation at any time to produce a revenue sufficient to meet operating expenditures and maintain the property in safe condition; as costs have advanced materially since then there is no question as to the inability of the Berkshire Street Railway to start the service.
>
> Briefly, this line is 23.86 miles in length and one of the best designed and constructed in New England, but there is not a sufficient sentiment locally to produce revenue to pay the actual cost to operate the service, and the revenue upon the remainder of the system is not sufficiently profitable for funds to be diverted to make up the losses upon this line.
>
> There is no question but that the continued operation of this line will be of great value. The Berkshire Street Railway is willing to devote this line to the public uses for the coming season, but must be assured of the full cost necessitated for the operation of such service as may be required, together with a sufficient fund to place the trackage in safe operating condition. Under the law the towns of Lee, Otis, Becket, Blandford and Huntington can contribute up to $1 for every $1,000 of assessed valuation, but as this entire tax would amount to only $6,000, there will have to be other funds made available for such appropriation. There is ample precedent for all this, as there are instances where towns have made direct contributions to take up losses incurred by operation of electric railway service and also an instance in which the electric railway received a sum of money to place the trackage in safe condition.

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## No Change in Coney Island Fare

Lewis Nixon, Public Service Commissioner for the First District of New York, has decided that the dual subway contracts did not intend that a 10-cent fare should be charged on three lines and a 5-cent fare on one and as a result there will be no reduction in the fare to Coney Island this summer. Commissioner Nixon finds that it would be impossible to force the Brooklyn Rapid Transit Company to cut its 10-cent rate on the New Utrecht line before the Culver line is completed to Coney Island as well, which will not be before the first of next year or possibly next summer. Commissioner Nixon rendered his decision in reply to the contention of a taxpayer.

## Favors "Measured Service"

### "Forum" at San Diego Results in Many Constructive Suggestions—Interviews Also Secured

In connection with the recent suggestion made by the San Diego (Cal.) Electric Railway for a 5 and 10-cent zone system with reduced-rate tickets, in the hearing before the California Railroad Commission, the company is now busily engaged in explaining the plan fully to the public. The zone suggestion was noted in the ELECTRIC RAILWAY JOURNAL of May 17.

Besides publishing a full page advertisement to present a general statement of the facts, the company is running in the morning paper a "Forum," which is made up of letters sent in from citizens who have suggestions to present. The company has stated that it is in a receptive mood, and the people are taking advantage of the opportunity. For some time now the company has had all the letters that space would permit it to print. The letters are answered frankly and fully, in order to acquaint the public with all details of the plan.

### Interviews Also Secured

The company is also interviewing many prominent citizens to get their ideas as to the advisability of a flat-fare increase or a zone system. For example, there has been published an interview with Mayor Louis J. Wilde, in which he declares himself in favor of the company's suggestion. Mayor Wilde says:

> I am a firm believer in "measured service." Pay for what you get; that is what everybody expects to do. The man who rides two or three times a day in the downtown districts is not supposed to be paying for somebody who lives 2 miles out in the country.

At first the idea of a zone system seemed to meet with a great deal of disfavor, especially and naturally among those living in the outer zone. As the situation is understood, however, the company finds that the idea of "measured service" is gaining in favor.

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## Modification of Skip Stop in Dallas

Modification of the skip-stop plan of operating cars is to be ordered in Dallas, Tex., according to announcement from the office of Lynn B. Milam, supervisor of public utilities. The changes include elimination of all skip-stop regulations after 10 o'clock at night throughout the city, also on rainy days, and the installation of additional stops on certain lines where patrons petition for additional stops. All skip stops will also be abolished in the downtown shopping district, which includes Elm, Main and Commerce Streets from Harwood to Lamar. In connection with the skip stop, the Dallas Railway published a history of the skip stop in Dallas. This was displayed as a five-column advertisement in the various Dallas newspapers.

### Yonkers Fare Upheld

The validity of the ordinance permitting the Yonkers (N. Y.) Railroad, included in the system of the Third Avenue Railway, New York, to charge a 5-cent fare within the city and another 5-cent fare when the city limits are passed, was upheld in the decision rendered on May 26 by Supreme Court Justice Joseph Morschauser, in chambers at Poughkeepsie. The ordinance was contested in the taxpayer's suit of Henry Koster.

The chief ground of his case was that the ordinance was passed by a scant majority of the Council instead of three-fourths. It had received only six votes. The court ruled that this simple majority was sufficient, and the ordinance valid. An appeal is considered almost certain.

The 10-cent fare has been charged since April 24. There are about 50,000 riders daily on the Yonkers Railroad, 20,000 of whom go beyond the city limits, and have to pay the double fare. About 15,000 of these riders go into New York city.

At Hastings-on-Hudson, where the service was abandoned altogether, the company has submitted a new franchise, which provides for operation on the Warburton Avenue line, a stretch of 1 mile of track, but does not provide for operation on the Uniontown line. The Uniontown line runs from the center of the village to the outskirts, and is 1½ miles long. The residents living along this line held a meeting recently protesting against any franchise which did not give service on the Uniontown line.

The proposed franchise would charge 5 cents within the village. The Village Trustees may put it to a referendum vote.

### City Agreed on Fare Policy

City Counselor Daues of St. Louis, Mo., has notified Thomas E. Francis, counsel for the United Railways, that the city will not object to a continuance of the 6-cent fare for a reasonable time. C. E. Smith, consulting city engineer, who was also at the conference, indicated that a reasonable period might be from May until next November, when it is expected that the valuation of the properties of the United Railways, which is being made by the Public Service Commission, will have been completed. Mr. Daues also suggested that the period might depend upon conditions which are found by Receiver Rolla Wells after he has been in charge of the property a sufficient length of time to determine what retrenchments can be made.

The conference was in advance of the meeting of the commission in St. Louis on May 19 to decide whether the 6-cent fare should remain in force after June 1. When asked, through Receiver Rolla Wells, what the company's attitude would be on the retention or increase of the fare, Mr. Francis said that the company would lay before the commission figures of cost showing the most recent wage demands on the company.

### Ten Fare Districts for Eastern Massachusetts

The committee on street railways of the Massachusetts Legislature reported a bill May 27 giving the Public Service Commission authority to fix rates of fare upon the lines of the Eastern Massachusetts Street Railway, formerly the Bay State Street Railway. Under the act of 1918 placing the road's operation in the hands of public trustees, the trustees were empowered to fix fares independent of the commission. The bill requires the public trustees to divide the system into at least ten fare districts, and in each district the commission is required to "determine the just and reasonable rates of fare for the service performed." At the end of each period of three months following the fixing of fares, the commission is required to report to the State treasurer whether the revenue received by the company has been sufficient to meet its operating expenses. If there is a deficit the amount is to be made up from the State treasury, to be assessed later in the form of a State tax upon the cities and towns in the fare district in which the deficit occurred. The proportion in which the municipalities in any given district are to contribute is to be determined by the commission.

### New Fare Terms Accepted

On May 21 the Columbus Railway, Power & Light Company, Columbus, Ohio, filed with the city its formal acceptance of the terms of the ordinance enacted on April 21, which provides for an increase in fare from eight tickets for a quarter to six tickets for a quarter for a period of two years. A similar ordinance for the Central Market division of the road is before Council and will probably be passed.

Petitions containing more than 10,000 names have been filed, asking for a referendum vote on the franchise. Only 7200 are required for the matter to be put to a vote. If a sufficient number of valid names are found on these petitions, the question of an increase in the rate will go to a vote of the electors on Aug. 12.

While it is difficult to tell just how the voters will ballot on this ordinance, Charles L. Kurtz, president of the company, is said to feel that the measure will be approved. Mr. Kurtz some time ago expressed the opinion that the rate granted would not cover the needs of the company, but it is evident that the officers are willing to try it out before refusing it.

As a substitute for the ordinance accepted, Councilman A. E. Griffith had introduced a measure which gave Council additional control over the operation and provided that, if the service requirements ordered by Council were not observed, the old rate of fare would be resumed. It is believed that this ordinance will die in committee, now that the other one has been accepted.

### Fare Increase for Schenectady

The Public Service Commission for the Second District of New York has authorized the Schenectady Railway to put into effect a 6-cent fare in Schenectady and to increase the rates of fare on the Troy and Ballston divisions. No increases are allowed on the Albany division, between Albany and Schenectady, and there will be no changes in commutation rates, and all such rates, school and special rates on the entire system will remain unchanged. The company operates 140 miles of line in Schenectady and between Schenectady, Warrensburg, Lake George, Glens Falls, Troy and Albany. Increased fares permitted on the Ballston division are:

| | |
|---|---|
| Zone 1—Schenectady to Alplaus | From 5 to 6 cents |
| Zone 2—Alplaus to High Mills Road | From 5 to 7 cents |
| Zone 3—High Mills Road to Timesons | From 5 to 7 cents |
| Zone 4—Timesons to Brookline | From 5 to 7 cents |
| Zone 5—Brookline to Ballston Junction | From 5 to 7 cents |
| Zone 6—Ballston Junction to Leonards | No change |
| Zone 7—Leonards to Saratoga | No change |

Interzone fares are increased as follows:

| | |
|---|---|
| From Zone 1 to Zone 2 | From 10 to 12 cents |
| From Zone 1 to Zone 3 | From 15 to 18 cents |
| From Zone 1 to Zone 4 | From 20 to 24 cents |
| From Zone 1 to Zone 5 | From 25 to 30 cents |
| From Zone 1 to Zone 6 | From 31 to 36 cents |
| From Zone 1 to Zone 7 | From 37 to 42 cents |

Other interzone fares are increased proportionally.

The increased fares on the Troy division are:

| | |
|---|---|
| Zone 1—From Schenectady to Morgan Avenue | From 5 to 6 cents |
| Zone 2—Morgan Avenue to Niskayuna | From 5 to 7 cents |
| Zone 3—Niskayuna to Lathams | From 5 to 7 cents |
| Zone 4—Lathams to Boulevard | From 6 to 7 cents |
| Zone 5—Wiswalls | From 6 to 7 cents |
| Zone 6—Watervliet | No change |
| Zone 7—Green Island and Troy | No change |

Interzone fares are increased as follows:

| | |
|---|---|
| From Zone 1 to Zone 2 | From 10 to 12 cents |
| From Zone 1 to Zone 3 | From 15 to 18 cents |
| From Zone 1 to Zone 4 | From 20 to 24 cents |
| From Zone 1 to Zone 5 | From 20 to 24 cents |
| From Zone 1 to Zone 6 | From 20 to 24 cents |
| From Zone 1 to Zone 7 | From 26 to 30 cents |

Other interzone fares are increased in proportion.

# Transportation News Notes

**Interstate Increase Allowed.**—The Bay State Street Railway's petition for increased fares between Fall River, Mass., and Newport, R. I., has been granted by the Interstate Commerce Commission.

**Eight Cents in Peekskill.**—Starting on May 23 the Westchester & Putnam Street Railway began charging 8 cents instead of 7 cents for fare. Fearing the company might suspend operations, the citizens petitioned for the increase.

**New Fare Tariff Filed.**—The Troy & New England Railway, Troy, N. Y., operating between Alvia and Averill Park, under a tariff filed with the Public Service Commission for the Second District, and proposed as effective on June 12, will make increases in one-way and round-trip fares.

**Increase to Seven Cents in Dubuque.**—The Dubuque (Ia.) Electric Company has been granted a fare of 7 cents, with four tickets for a quarter, this increase having been authorized by the City Council in order to allow the company to increase its wages and prevent a strike. Under the terms of the increase the company will continue to allow working girls to ride for 2½ cents.

**Five-Cent Fare May Continue.**—The April operating report of the Mahoning & Shenango Valley Railway, Youngstown city lines, indicates that the 5-cent fare may be retained there for several months longer than originally expected. The deficit under the service-at-cost plan was $5,382 as against about $9,000 each for the two preceding months and the stabilizing fund on April 30 was $16,000 above the minimum.

**Service Satisfactory in Dallas.**—Electric railway service in Dallas, Tex., is apparently satisfactory. Mayor Wozencraft recently advertised a public hearing before L. B. Milam, supervisor of public utilities, and the Board of City Commissioners. Wide publicity was given to the hearing and all who had complaints to make regarding service were asked to appear and make such complaints known. On the appointed day only three minor complaints were received.

**One-Way Books Authorized.**—The Public Service Commission for the Second District of New York has passed orders directing George Bullock, receiver of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to issue a twenty-six one-way family ticket book, valid only on the Hamburg Division, fares computed according to mileage, and a twenty-four one-way ticket book, the latter for $1.44, between Dunkirk and Fredonia, the orders to become effective on June 1.

**Wants Fares Raised and Jitneys Abolished.**—At a mass meeting in Hutchinson, Kan., on May 18 to determine whether it was necessary to raise fares, a committee was appointed to bring two conditions before the City Commission, a raise of fare from 5 cents to 7 cents on the Hutchinson Interurban Railway and the abolishment of the 10-cent jitneys on the streets. This is in line with the demands made by President Carey, of the railway.

**Wants Jitneys Barred.**—The Morris County Traction Company, Morristown, N. J., has sent a communication to the City Council, of Summit, N. J., protesting against the operation of the jitney service between Summit and Maplewood in competition with the electric railway. The petition has been referred to the law and ordinance committee. The railway contends that the jitney service is neither a public convenience nor a necessity; that it is not remunerative to the city, and that the service is uncertain and unsafe.

**Improvements in Return for Increase of Fare.**—The City Council of Canton, Ohio, has received a communication from the Northern Ohio Traction & Light Company to the effect that it will make improvements and extensions amounting to $120,269 if the city will allow it to charge a fare of 6 cents on the city line for the period of one year. The improvements are to be completed before the increased charge is put into effect. This, it is understood, complies with the terms of the city and means a settlement of the matter.

**Wants Seven Cents in Niagara Falls.**—The International Railway, Buffalo, N. Y., has applied to the Public Service Commission for the Second District, for permission to charge a 7-cent fare in Niagara Falls. The present fare is 5 cents, with transfer privileges. The railway says the 5-cent rate under existing conditions is confiscatory, unjust and unreasonable and not sufficient to give a reasonable average return upon the value of the property used in the public service with due regard for necessity of reservation of income for surplus and contingencies.

**May Designate Auto Routes.**—Because of chronic traffic congestion in Pittsburgh the city has been allowed the right by the Public Service Commission of Pennsylvania to designate the streets in the East Liberty and downtown districts over which auto bus lines may operate, and to change their terminal loops as conditions may dictate. This ruling was issued at a hearing recently on the applications of the backers of two proposed bus lines between East Liberty and the downtown district. The city and the Pittsburgh Railways opposed the granting of the permits on the grounds that the routes proposed lead through districts of great congestion.

**Suburban Fares Revised Downward.**—The Louisville (Ky.) Railway, which raised rates on its interurban lines in July, 1918, resulting in the case being carried by country residents before the State Railroad Commission, has lost its fight. An increase of 20 per cent over the old rates was allowed, but the present rates, which were just double the ones in effect prior to July, 1918, have been ordered reduced to the 20 per cent figure. Under the new regulations all 15-cent fares are increased to 18 cents; 20-cent fares to 24 cents, figuring a 1-cent increase on every 5 cents under the old rules. Special rates were made on business books, school books, round-trip tickets, etc.

**New Zones on Wheeling Line.**—Five new 5-cent fare zones are permitted on three of the principal electric railways of the Northern West Virginia Panhandle, by a decision of the Public Service Commission of West Virginia. The decision was made following application of the Wheeling Traction Company for its own lines and for those of the Panhandle Traction Company and the Steubenville, Wellsburg & Weirton Railway, both of which are controlled by the Wheeling Company under lease. By the same decision the sale of commutation books containing fifty-two tickets for $4.07 is ordered and the company is directed to make immediate improvements in service. The new rates are effective from May 29.

**Wants Streets Called in Houston.**—The city attorney of Houston, Tex., has drafted and presented before the City Commissioners an ordinance that would revive an old city ordinance requiring conductors on all street cars to call the names of the streets so that all persons on the cars may hear. The ordinance met opposition because of the fact that a number of one-man cars are in operation in Houston and it was claimed that the conductor-motorman could not operate his car with due regard to the safety of passengers and outside traffic and at the same time watch crossings and call the streets as they were crossed. Passage of the ordinance was delayed so that further investigation might be made.

**Maine Company Wants More.**—A. H. Ford, general manager of the Portland Railroad, which is controlled by the Cumberland County Power & Light Company, Portland, Me., addressed two meetings at South Portland recently in accordance with his promises made in February to report the condition of the Portland Railroad and how the new fare zone and ticket system had worked out. He stated that in four months the deficit of the Portland Railroad had amounted to $112,000 due to large increases in wages, the expense of maintenance and equipment and other items and that the figures taken from the company's books indicated that the 6-cent fare was not sufficient to enable the company to render good service or meet its bills. Mr. Ford said that confronted by these facts the company was compelled to petition the Public Utilities Commission for permission to increase the rate of fare one-third of a cent per zone, making the fare for a three-zone ride 7 cents instead of 6 as at present.

# Personal Mention

## Mr. Delaney Construction Commissioner

John H. Delaney, Brooklyn, was named by Governor Smith on May 26 as Transit Construction Commissioner for New York City. Mr. Delaney is City Commissioner of Plants and Structures. The office of Transit Construction Commissioner was created by the 1919 Legislature in one of the bills reorganizing the First District Public Service Commission. In a statement announcing the appointment the Governor said he had believed the construction department should be presided over by an engineer, and accordingly had offered the post to William Barclay Parsons and J. Waldo Smith, both of whom had declined. After conferring with Lewis Nixon, commissioner in charge of the division of regulation, he had decided that there existed in the Public Service Commission sufficient engineering ability to carry the proposed subway routes to completion. In this connection he said:

> What is really needed is a clear-headed, common-sense administrator with a knowledge of public office and an appetite for hard work.
>
> Mr. Delaney's ability, energy and willingness to work came to my attention during the year that I sat in the Board of Estimate & Apportionment. In all respects, I regard the Commissioner of Plants and Structures as the best equipped man to take charge of this important work.

Mr. Delaney was Commissioner of Economy and Efficiency in the State government during the Sulzer and Glynn administrations. Governor Smith was active as Democratic floor leader in the Assembly in promoting legislation which abolished that department. Mr. Delaney received his appointment through Governor Sulzer after serving first on a commission to investigate the finances of the State, of which John N. Carlisle, an independent Democrat from Watertown, was chairman. As Commissioner of Economy and Efficiency, Mr. Delaney wrote a work on the "Organization and Functions of the State Government," which was issued as a text book, and accepted as a standard by the Constitutional Convention.

## New President of Chamber of Commerce

Homer L. Ferguson, president and general manager of the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., has been elected president of the Chamber of Commerce of the United States. Mr. Ferguson succeeds as president Harry A. Wheeler, Chicago, who declined reelection.

Mr. Ferguson was born at Waynesville, N. C., on March 6, 1873. He was graduated from the United States Naval Academy in 1892, and attended Glasgow University, Scotland, finishing there in 1895. For eleven years he was a constructor in the United States Navy, leaving the navy in 1905 to become general manager of the company of which he is now president. He is a member of the Society of Naval Architects and Marine Engineers, the Society of Naval Engineers, the Engineers' Club, New York, and the Army and Navy Club, Washington.

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**Charles J. Sibert** has been appointed assistant master mechanic of the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., reporting to the master mechanic.

**Donald Stewart**, formerly vice-president of the Engineering Supervision Company, New York, N. Y., has been appointed general superintendent of the Ithaca (N. Y.) Traction Corporation.

**W. R. Alberger**, vice-president and general manager of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has been elected president of the California Electric Railway Association.

**Frank W. Matteson** was elected president of the Providence, Warren & Bristol Railroad at the annual meeting of stockholders in Providence, R. I., on April 28. He succeeds Nathaniel W. Smith.

**H. J. Musgrove**, who was in the Signal Corps of the Army, has returned and has resumed his former duties of local superintendent of the Central Illinois Public Utilities Company, Marion, Ill.

**Everett M. Sweeley**, former Mayor of Twin Falls, a well-known attorney, has been appointed by Governor Davis as a member of the Public Utilities Commission of Idaho to succeed John W. Graham, resigned.

**Ward S. Hubbard**, superintendent of roadway and building of the Bay State Street Railway, Boston, Mass., has resigned and been appointed general manager of Turner Brothers Glass Company, Terre Haute, Ind.

**Dr. E. A. Sommer** has been appointed chief surgeon of the Portland Railway, Light & Power Company, Portland, Ore., effective June 1, succeeding Dr. E. A. Rockey, who resigned to devote his entire time to private practice.

**Norman Oille**, North Tonawanda, N. Y., has been elected secretary of the International Railway, Buffalo, N. Y., to succeed the late George W. Wilson. Mr. Oille has been serving as a clerk in the office of Edward G. Connette, president of the company.

**Sir John F. Aspinall**, formerly general manager of the Lancashire & Yorkshire Railway, has joined the board of the recently consolidated English Electric Company, Ltd., of which railway electrification work at home and abroad forms one of the most important departments. The Lancashire & Yorkshire Railway was one of the pioneers of suburban line electrification in England.

**A. A. Dunlap**, division engineer at Tipton, Ind., of the Union Traction Company of Indiana, Anderson, Ind., resigned on May 5 to become associated with the Van Briggle Motor Device Company, Indianapolis, Ind. Mr. Dunlap became division engineer on the Union Traction Company in May, 1911, and for several years previous to that served as chief clerk of the way department of the same company.

**C. A. Prentice**, division engineer at Muncie, Ind., of the Union Traction Company of Indiana, Anderson, Ind., resigned on May 1 to become associated with a brother-in-law in road-building work in Michigan. Mr. Prentice has been connected with the railway at Anderson since Dec. 5, 1910. The employees of the company at Muncie clubbed together and presented Mr. Prentice with a gold watch as a farewell gift.

**John T. Conway**, superintendent of the Brockton district of the Bay State Street Railway, Boston, Mass., for twenty years, was surprised at the office of the company recently when the clerks and the union employees gathered to show their appreciation of the friendly relations that have existed between the superintendent and his helpers. The clerks presented Mr. Conway a handsome smoking set, with brass lamp attachment, and the members of the union presented him a purse of $150 in gold.

**David Curtin**, for fourteen years chief engineer of maintenance and way construction for the Bay State Street Railway, Boston, Mass., and earlier prominent in steam railroad construction in the Far West and Rocky Mountain district, has become associated with the G. Ferullo Company, Inc., Boston, as president and manager. Mr. Curtin will make a specialty of electric railway construction and maintenance in his new capacity, and will also undertake a general public works engineering construction business.

**Brig.-Gen. George H. Harries**, a vice-president of H. M. Byllesby & Company and formerly president of the Louisville Gas & Electric Company, Louisville, Ky., has recently had conferred upon him two new honors. One of these was the American Distinguished Service Cross conferred by General Pershing in recognition of his services at Brest in the early part of the war. The other was conferred by the French General Dupont, General Harries being made a Commander of the Legion of Honor, also in recognition of his work at Brest.

**George Newell**, superintendent at the Everett offices of the Stone & Webster interests since the construction of the

Seattle interurban nine years ago, succeeds D. C. Barnes as acting manager in charge of the Puget Sound International Railway & Power Company controlling the railway and light properties at Everett. Mr. Barnes, as noted in the ELECTRIC RAILWAY JOURNAL for May 24, has been transferred to Seattle. Mr. Newell has been in the employ of Stone & Webster for years. He entered their offices in Boston when a boy. Later he went to the Northwest and for a time was superintendent of the interurban lines at Seattle when they extended to Cedar Valley. Upon the completion of the line to Everett he was assigned to Everett as superintendent over the entire division.

**John W. Belling** has been appointed secretary of the New England Street Railway Club, succeeding George W. Knowlton, acting secretary for nearly a year past. Mr. Knowlton retires on account of the increasing pressure of his business interests. Mr. Belling is a native of Alma, Wis. He was graduated in electrical engineering in 1903 from the University of Wisconsin. He spent three years in the testing department of the General Electric Company, Schenectady Works, and during the last year of this service was occupied in testing electric locomotives for the New York Central electrification. The next three years were spent in the construction department of the General Electric Company, and included installation and operating supervisory duties on the Washington, Baltimore & Annapolis Railroad and the West Jersey & Seashore Railroad electrifications. In 1909 Mr. Belling was transferred to the railway department of the Boston office of the General Electric Company, and has since been active in sales engineering work in the traction field. He will continue his work with the General Electric Company. Mr. Belling is a member of the Boston City Club, and has a wide circle of friends in the New England field. He will also be editor of the *Street Railway Bulletin*, the official organ of the New England Street Railway Club.

**Maj. John L. Retallack** has been appointed by the government of British Columbia to be public utilities commissioner for the province under the new public utilities act, reviewed brefly in the ELECTRIC RAILWAY JOURNAL for May 3, page 876. Major Retallack is a returned soldier, having gone overseas as quartermaster of the Forty-eighth battalion. Later he was transport officer in the railway corps. He is a mining engineer and a member of the Canadian Mining Institute. The new commissioner was born in Quebec on Dec. 2, 1863, and was educated in England. He served for five years with the Royal Northwest Mounted Police before coming to British Columbia in 1890. The appointment of Major Retallack came after several days of public clamor, the government's first appointment of R. H. Gale, Mayor of Vancouver, having met with such opposition from the returned soldiers' organization that Mr. Gale tendered his resignation. When the appointment of Mr. Gale was announced on April 17, gatherings in Vancouver denounced the move and Mr. Gale went to Victoria to consult the cabinet. On his return, on April 19, he announced that he had resigned. Mr. Gale had been active in opposition to the British Columbia Electric Railway and in addition to this fact being urged against him there was a general demand that preference to any vacant position be given to a returned soldier. The commissionership carries with it an annual salary of $7,000.

**E. F. Ramey** has been appointed general manager and purchasing agent of the Goldsboro (N. C.) Electric Railway. Mr. Ramey was born and reared in Lexington, Ky. He entered electric railway work in 1904 as a conductor with the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., but returned to his home city in 1910 and worked in various departments of the Kentucky Traction & Terminal Company. For the past eighteen months, Mr. Ramey has been with the Columbia Railway, Gas & Electric Company, Columbia, S. C., as general storekeeper. He resigned from the company at Columbia to accept the appointment in Goldsboro.

E. F. RAMEY

**W. O. Clure** has been made assistant to A. W. Warnock, general passenger agent of the Twin City Lines, Minneapolis, Minn. Mr. Clure has been an instructor in the University of Minnesota, is editor and publisher of *The Progress*, a weekly paper, and has been secretary of the Republican State Central Committee. Horace Lowry, president of the company, announced that "at this time when the railway is dealing with the cities of Minneapolis and St. Paul, it seems advisable to add to our staff an additional man who can meet people informally at their various meetings to discuss the present crisis in the cities' transportation problem." Mr. Clure has for some years made a study of railway franchises and has consented, temporarily at least, to assume the above work as assistant to the general passenger agent.

## Obituary

**David Tod**, president of the Youngstown & Suburban Railway, died at his home in Youngstown, Ohio, on May 14 from an attack of typhoid pneumonia. Mr. Tod was born at Girard, Ohio, in 1870. Besides his connection with the railway, Mr. Tod was director and vice-president of the Commercial National Bank, director of the Brier Hill Steel Company, director of the Bessemer Limestone Company, Stambaugh-Thompson Company and the Ward Nail Company, vice-president of the David Tod Land Company and trustee of the George Tod Estate.

**Harry Allan Abbe** died at Saranac Lake, N. Y., on May 22, after an illness of eight weeks. Mr. Abbe was born in New Britain, Conn., on Oct. 21, 1885. He was graduated from Yale College, Sheffield Scientific School, in 1905. He was employed by the Westinghouse Air Brake Company for several years, and later entered the employ of Peck-Shannahan-Cherry, Inc., Syracuse, N. Y., as superintendent of the Syracuse & Suburban Railroad. At the time of his death he was superintendent of the Syracuse Northern Electric Railway, Inc. He was married on Nov. 20, 1913, to Elsie M. Peck, daughter of Edward F. Peck, Hampton, Va. He is survived by his widow and two sons.

**Henry A. Webster**, master mechanic of the Manhattan division of the Interborough Rapid Transit Company, New York, died on May 14. Mr. Webster was born on Feb. 3, 1839, at Plymouth, N. H. He entered railway service in 1858 and continued in that work without interruption until just before the sickness that resulted in his death. From 1858 up to the time of his connection with the New York Elevated Railway in 1878 Mr. Webster served in various capacities on a number of railroads in New England and New Jersey. He served the New York Elevated Railway and its successor, the Manhattan Elevated Railway, from June, 1878, to March, 1899, as general foreman of the car department. From March, 1899, to June, 1899, he was master car builder of the company and from June, 1899, up to the time of his death he was master mechanic of the Manhattan Elevated Railroad and its successor, the Interborough Rapid Transit Company, New York. As master car builder of the Manhattan Elevated Railway Mr. Webster was in charge of all the cars in the steam service and the Ninety-eighth Street car shops. As master mechanic of the company he was in charge of all cars, locomotives and shops and when the locomotives were withdrawn from service on account of the change of power to electricity he had charge of the sale and disposal of all the locomotives and cars.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Storage Battery Car Market Brightening

### Estimates Being Prepared on Sixty-One Cars for South America—Domestic Business Awakening

In the recent report of the Railway Storage Battery Company for 1918, an operating profit of upwards of $8,000, instead of the customary deficit, was shown for a year of war conditions. Actual deliveries in 1918 consisted of eight cars, with one car and two chassis now awaiting delivery.

The export trade of the company was reported active with the promise of still greater activity. The company is now figuring on sixty-one cars for export to Latin America. Domestic business, suspended during the war, shows signs of awakening, says President S. C. Steinhardt, and were government restrictions to be removed, it is felt that considerable business would follow.

An arrangement has been made for an exposition and demonstration of the Edison storage battery car at the Railway Master Mechanics' Association, Railway Master Car Builders' Association and Railway Supply Manufacturers' Association Convention at Atlantic City the week of June 18. The tracks of the Atlantic City & Shore Railroad from Atlantic City to Ocean City are to be used for this purpose.

## Pole Prices Steady

### Buying Picking Up with Better Outlook for Improvement in Late Summer Months

Pole prices, according to advices from the Pacific Coast, have been very steady for a year and a half in spite of increased freight rates, increased cost of handling and other factors. Competition is very keen along the Coast, with its many forests and odd bits of timber land. The past quarter has witnessed a revival of former brisk pole conditions, for there are a number of jobs in sight requiring several thousand poles and many styles of insulators and pieces of pole-line hardware. Eastern business has picked up also.

Stocks of cedar poles in the shorter lengths while not large are sufficient, it is thought, to take care of any business that might come up this year. Large poles are not in such ample supply. Conditions last winter were not favorable to pole cutting and hauling and consequently large stocks could not be piled up.

Dealers look forward to better buying late this summer to take care of fall line maintenance needs.

## Transformer Market Improving

### Both Domestic and Export Volume of Sales Are Better—Inquiries Also Improving

The transformer market is reviving under the stimulus of business expansion throughout many parts of the country. Orders from the Middle West are active, the Pacific Coast is buying somewhat more freely, and the East is falling into line with increasing inquiries and better sales. Within a month one Middle Western central station has ordered no less than 54,000 kva. in transformers. Foreign business, notably from Spain and Norway, shows healthy gains, these being due largely to hydroelectric developments. Although much more building is to be started later in comparison with the present low volume, central stations are increasing their line extensions in many localities; inquiries are coming into the factories at an unsurpassed rate.

## Record Westinghouse Year

### Sales Billed During Fiscal Year Amount to $160,379,943 with Unfilled Orders of $76,248,000

Figures were made public on Monday showing the record business done by Westinghouse Electric & Manufacturing Company during the fiscal year ended March 31 last. Sales billed totaled $160,379,943, against $95,735,407 the year previous. Unfilled orders on April 1 amounted to $76,248,000.

Sales billed include shipments by the New England Westinghouse Company and J. Stevens Arms Company from Jan. 1, 1918. After Sept. 1 the New England company's plants will be devoted to producing industrial motors and automobile starting and lighting apparatus.

A condensed comparative statement of operations for the past three years follows:

## Wire Prices Follow Copper Upward

### Rubber Covered Base at 21 Cents—Bare and Weatherproof 18¼ to 20 Cents

Advances in the copper market of the past two weeks have had their expected effect on the prices of copper wire. The prices herein are as of May 28, but there is no telling how long they will last.

Copper started up about three weeks ago, and increased 1 cent to 16.37½ cents a pound. The first ten days showed heavy sales of the metal, but these have dwindled down to a rather quiet market. During this time there were reported large sales of wire rods for England, and domestic electrical manufacturers are reported to have satisfied their copper wants for a few months.

Certain kinds of wire follow the trend of the copper market more closely than do others. Rubber covered wire is least affected by small changes in copper and would hardly be expected to change on fractional changes of copper. When copper changes a cent or two then corrections may be looked for in rubber covered. On May 28 producers were quoting, for the most part, on a 21-cent base. Prior to that a 20-cent base had been holding for about eleven weeks.

Weatherproof wire and bare copper wire follow the copper market rather closely, and a change of one-quarter of a cent is likely to affect the price of these two wires. Bare wire base is around 18½ and 19 cents a pound. Weatherproof is reported on a 19 to 20-cent base. But a small change in copper is almost sure to change these prices.

The recent advance in cotton will probably be felt in the price of insulated wire if it has not already appeared. Stocks of cotton materials on hand may permit of a postponing for a short time of an added increment to

| | Year Ended March 31 | | |
|---|---|---|---|
| | 1919 | 1918 | 1917 |
| Gross earnings—sales billed | $160,379,943 | $95,735,407 | $89,539,442 |
| Cost of sales—Cost of manufacture, including depreciations of property and plant and all selling, administration and general expenses and all taxes | *144,667,402 | 80,225,937 | 72,077,752 |
| Net manufacturing profit | $15,712,541 | $15,509,470 | $17,461,690 |
| Other income | 1,623,262 | 1,325,263 | 1,386,547 |
| Gross income from all sources | $17,335,803 | $16,834,733 | $18,848,237 |
| Less—Inventory adjustments, inactive apparatus and materials scrapped, bad accounts and extraordinary items of expense charged to income | † | † | † |
| Net income applicable to interest and other charges | $17,335,803 | $16,834,733 | $18,848,237 |
| Interest charges | 2,276,795 | 1,429,052 | 768,348 |
| Net income available for dividends and other purposes | $15,059,008 | $15,405,681 | $18,079,889 |

† Included in cost of sales.

* Includes $15,395,846.16 Federal income and excess profits taxes.

insulated wire price, but if cotton remains up any length of time this addition may be expected. There is better buying of weatherproof wire and a considerable increase in inquiries.

There has been found some increase in orders for signal wire for electric railway use, but in no sense anything like normal buying.

## Cotton Advance Reflected in Insulating Materials

### Cloths and Oils Show Sharp Advances—Tapes Holding Steady—Repairs Keep Up Demand

Following the recent advances in cotton prices there have been found substantial advances in certain insulating materials. Insulating cloth and oils have been subjected to a decided increase in price. Non-metallic flexible conduit has advanced 20 to 25 per cent. So far as could be learned, however, there have been no advances in friction tapes and white cotton webbing.

The stability in price of these tapes is undoubtedly because of stocks of raw materials on hand sufficient in size to carry along production for some time. One manufacturer expects to see no necessity for a price change for three months.

There has been a better demand for insulating materials of late. The amount of repair work carried on in the railway shops is a factor in keeping a steady flow of this material in the market.

## Price Levels Expected to Hold for Some Time

The Electric Bond & Share Company, New York City, has sent out a circular etter under date of May 12 to its utili- ies that it would keep them informed rom time to time on the tendencies of price changes. There was inclosed a opy of the address of Irving Fisher efore the Conference of Governors and Mayors at the White House in March, wherein the continuance of the present rice level was upheld. The company onsiders that this address ably presents this side of the subject and expects further reports of a more or less imilar nature from possibly different ngles as time goes on. These are to e forwarded in order to keep the utili- es in touch with the generally ac- epted belief that the present price evels are to be permanent, and will decrease, if at all, only very gradually.

## Electric Railway Projected from Stockholm, Sweden, to Goteborg

According to Commercial Attaché . W. Thompson, electrification of all e principal railroads of Sweden is ost logical in view of the dearth of al and the wealth of water power. he plan has been recently discussed the Danish press for an electric ad connecting Goteborg and Stock- lm.

## Rolling Stock

**Nashville Railway & Light Company, Nashville, Tenn.**, has been granted permission by the Tennessee Railroad and Public Utilities Commission to purchase ten new street cars, it is reported. The cost is estimated at $57,980, and permission is granted the company to issue par notes for $33,425 of this amount. The cars will be purchased from the American Car Company of St. Louis.

## Recent Incorporations

**Levis (Que.) Tramways.**—Incorporated as a reorganization of the Levis County Railway and to extend the service in the counties of Levis, Bellechasse, Dorchester and Beavie.

**Miami Beach Electric Company, Miami, Fla.**—Incorporated to construct an electric railway at Miami Beach. Capital stock, $250,000. Officers: Carl G. Fisher, president; Arthur C. Newby, vice-president, and J. H. McDuffie, secretary and treasurer. [Apr. 26, '19.]

## Franchises

**Los Angeles, Cal.**—The Pacific Electric Railway has received a franchise from the City Council of Los Angeles for the construction of an electric line on Echo Park Avenue and portions of Sunset and Hollywoods Boulevards.

**Jackson, Miss.**—The Citizens' Public Utility Company has asked the City Council for a franchise to operate electric light and gas plants and an electric railway in Jackson. It is presumed that this company has been organized to take over the properties of the Jackson Light & Traction Company, which went into the hands of receivers recently.

## Track and Roadway

**Pacific Electric Railway, Los Angeles, Cal**—Plans are being discussed for the rearrangement of the San Pedro and Seaside Park lines of the Pacific Electric Railway in Long Beach.

**Pacific Gas & Electric Company, San Francisco, Cal.**—Extensions and improvements involving an expenditure of $3,400,000 are contemplated by the Pacific Gas & Electric Company during the current year.

**Chicago, Fox Lake & Northern Electric Railway, Chicago, Ill.**—The Public Utilities Commission of Illinois has ruled that the Chicago, Fox Lake & Northern Electric Railway has no right to build a suspended monorail road between Evanston and Palestine and ordered the company to discontinue issuing securities for financing the project. [May 4, '18.]

**Illinois Central Railroad, Chicago, Ill.**—The question of equipping the Illinois Central Railroad lines within the city limits for electrical operation is under consideration by the City Council of Chicago. Plans for carrying out the project will be submitted to the Council by the railroad and city engineers.

**Pekin (Ill.) Municipal Railway.**—The city of Pekin has been offered a quantity of second-hand street car rails for use in the extension of the Pekin Municipal Railway to the East Bluff under terms which are favorable to the building of the line. It is generally conceded that the line should be extended to the East Bluff as soon as possible as there is a wide range of territory to be served there and the public demand for the extension is marked.

**West End Street Railway, Medford, Mass.**—The Board of Aldermen has granted the petition of the West End Street Railway, the lines of which are leased to the Boston Elevated Railway, for the relocation of its tracks on Main Street from the Somerville line to Mystic Avenue and on Salem Street, from Medford Square to the Malden line.

**Mexico (Mex.) Tramways.**—While details of the arrangement by which the Carranza government has turned back to the Mexico Tramways company the electric railway system of the City of Mexico and the Federal District have not been made public, it is reported that the conditions require the early carrying out of the company's original plans for the construction of interurban lines between Mexico and Pueblo and Toluca. These two lines were under construction at the time the revolutionary period was inaugurated nearly nine years ago. At that time the company also had its plans well advanced for the building of a scenic railroad up the slopes of Mount Popocatepetl. This road was to have been of the cog-rail type for the last few thousand feet of the ascent.

**Perry, Mo.**—It is reported that I. S. Fisher of Moscow Mills, Mo., proposes the construction of an electric railway from Perry to Mexico.

**Cumberland Railway & Power Company, Fayetteville, N. C.**—Construction has been begun by the Cumberland Railway & Power Company of its line in Fayetteville.

**Tulsa (Okla.) Street Railway.**—Work has been begun by the Tulsa Street Railway on its Pearl Street extension from Hodge Street to the Lowell school.

**Guelph (Ont.) Radial Railway.**—The city of Guelph plans to issue bonds to pay for the reconstruction of an extension of the Guelph Radial Railway from Hespeler Street north to Mount Forest Street.

**Berlin & Northern Railway, Kitchener, Ont.**—The Ontario Legislature has authorized the Berlin & Northern Railway to change its name to the Waterloo-Wellington Railway, and has granted an extension of time for three years within which to extend its line from Bridgeport, its present terminus, to Elora and Fergus, Ont.

**Montreal (Que.) Tramways.**—It is reported that plans are being made by the Montreal Tramways for double-tracking 10 miles of its line on Lawrence Street to Gouvain Boulevard and through the village of Bordeaux to Park Avenue.

**Charleston Consolidated Railway & Lighting Company, Charleston, S. C.**—The Charleston Consolidated Railway & Lighting Company is reconstructing its track on the east side of the Meeting Street road from the plant of the Tuxbury Lumber Company to the Five Mile House.

**Sudbury-Copper Cliff Suburban Electric Railway, Sudbury, Ont.**—The Ontario Legislature has granted the Sudbury-Copper Cliff Suburban Electric Railway a three-years extension of time within which to complete the construction of its proposed extensions.

**Montoursville (Pa.) Passenger Railway** — The Montoursville Passenger Railway reports that it will reballast and lay new ties on 1 mile of track. The company states that it would like prices on bituminous binders for 1 mile of track.

## Power Houses, Shops and Buildings

**Iowa Southern Utilities Company, Centerville, Ia.**—Construction of a 20-mile extension is planned by the Iowa Southern Utilities Company of its transmission line from Diagonal to Shannon City and Tingley.

**United Railways & Electric Company, Baltimore, Md.**—A contract has been awarded by the United Railways & Electric Company to the Singer-Pentz Company, Baltimore, for the construction of a shelter station at Sparrows Point, to cost $10,000.

**Morris County Traction Company, Morristown, N. J.**—This company reports that during the next four weeks it expects to place contracts for the construction of a small dispatcher's office at Summit, N. J., and contemplates the construction of a substation at Denville.

**London & Port Stanley Railway, London, Ont.**—A report from the London & Port Stanley Railway states that it has awarded a contract to John Hayman & Sons, London, Ont., for the construction of a stone and brick passenger station at St. Thomas, Ont.

**West Virginia Traction & Electric Company, Wheeling, W. Va.**—The West Virginia Traction & Electric Company has recently completed the installation of new coal handling equipment in its Morgantown power house to facilitate operations.

**Wheeling (W. Va.) Traction Company.**—The Wheeling Traction Company contemplates the construction of a two-story carhouse and shops at a cost of about $75,000.

## Professional Notes

**Hubbel & Meaden** is the name of a new firm of tax and accounting consulting experts which will have offices at Room 306 Hickox Building, Cleveland, Ohio. Charles H. Hubbell, one member of the firm, was formerly with the Illinois Utilities Commission and later was federal tax consultant of the First National Bank of Cleveland and author of "A Story of the Income Tax" and "A Story of Liberty Bond Interest." Douglas S. Meaden was formerly statistician of the Illinois Public Utilities Commission.

**John F. Vaughan**, engineer, 185 Devonshire Street, Boston, Mass., has resumed his engineering practice. His resignation of his position as district manager (New England) for the Emergency Fleet Corporation became effective on May 1. Mr. Vaughan had been associated with Stone & Webster and with the late Col. N. H. Heft in the pioneer electrification work of the New York, New Haven & Hartford Railroad on the Nantasket Beach and other lines.

**Major George F. Sever, Engineers, U. S. A.**, has been honorably discharged from the United States Army after a service of fifteen months and will make his headquarters in New York City for consulting engineering practice. Major Sever, during his service, made extensive and detailed investigations of the electric power conditions in New England as well as on the Pacific Coast from Seattle to Los Angeles. His investigations covered careful analyses of the production of power by coal, oil and water, and the comparisons of these different methods.

## Trade Notes

**A. N. Hargrove**, foreign sales manager of the J. G. Brill Company, located at the company's Philadelphia office, has resigned his position.

**W. B. Conwell** has been elected president of the Safety Car Heating & Lighting Company to take the place of R. M. Dixon, who died a few months ago.

**J. P. Alexander**, formerly purchasing ing agent Wheeling (W. Va.) Traction Company and later representative of the General Electric Company at Trenton, N. J., is now connected with the power and mining department of the General Electric Company in New York City.

**Walter A. Zelnicker Supply Company, St. Louis**, has appointed F. X. Meehan advertising manager. Mr. Meehan was connected with Fairbanks, Morse & Company for six years; the Santa Fé Railroad for two years; and the St. Louis Smelting & Refining Works for two years.

**Massey Concrete Products Corporation, Peoples Gas Building, Chicago**, announces the appointment of P. E. Longstreet as resident manager of the Western district, in charge of all sales in that territory, with headquarters at 925 South Sixth Street, West, Salt Lake City, Utah.

**Elwell Trolley Supply Company** has arranged for representation on the Pacific Coast in Portland, San Francisco, and Los Angeles through the Eccles & Smith Company. An office has also recently been established at 332 South Michigan Avenue, Chicago, Ill., with M. O. Payne as manager.

**Ohmer Fare Register Company, Dayton, Ohio**, announces in "A Record of Recent Business" that twenty-seven different companies adopted Ohmer registers since January, 1918, while forty-nine companies renewed their existing contracts. In addition to these contracts, ninety companies increased the number of registers used on their lines.

**R. W. Van Pelt**, for the past two years in charge of Western sales of the insulated wire department of the B. F. Goodrich Company, Akron, Ohio, with headquarters in Chicago, has been promoted to charge of Eastern sales, insulated wire department, New York City headquarters. Mr. Van Pelt for a number of years was connected with the American Steel & Wire Company in a sales capacity for its insulated wire and cable department both in the Chicago and the Pacific Coast offices. He joined the B. F. Goodrich Company in 1912.

## New Advertising Literature

**Van Dorn Electric Tool Company Cleveland, Ohio**: Descriptive folder of the company's portable electric grinders.

**Joseph T. Ryerson & Son, Chicago, Ill.**: Bulletin 20,145 describing the Riley universal elliptic spring forming machine.

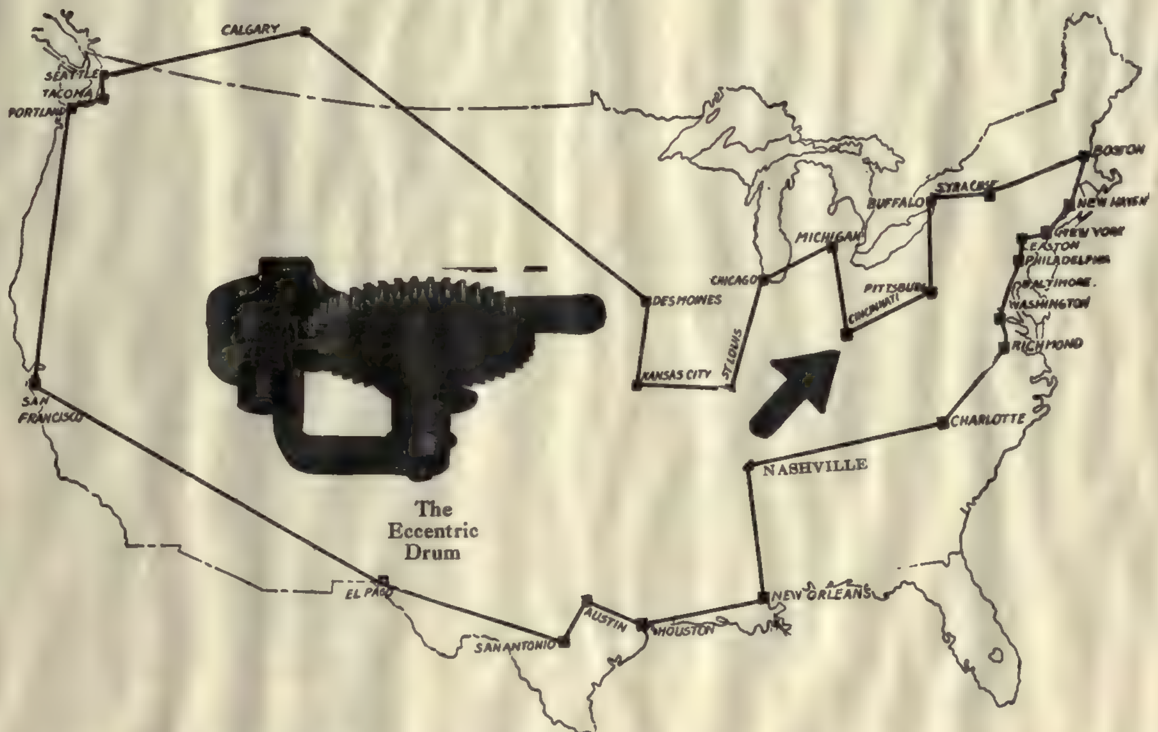
**Union Switch & Signal Company, Swissvale, Pa.**: Bulletin 92, describes the single and double-pole types of "Union Vane Relays."

**Locomotive Superheater Company, New York**: Bulletin T-2 of the Elesco superheater. Designed originally for a superheater of locomotives, this superheater has been adapted to stationary boilers, where it possesses many advantages.

**Allis Chalmers Manufacturing Company, Milwaukee, Wis.**: Bulletin No. 137 entitled "Works and Products," presenting in condensed form a description of the company and its capacity for production of prime movers and electrical machinery.

**Roller Smith Company, Bethlehem, Pa.**: Bulletin sheets Nos. 73 and 74 on "Standard" type alternating current and direct current circuit breakers, both overload and under voltage types, and Bulletin No. 550 on "Imperial" type direct current relays.

# Peacock Brakes from Coast to Coast



The Eccentric Drum

## Where Cincinnati's Grades run down to the Ohio River

—and elsewhere in this hilly city—

Peacock Brakes control the cars—Peacocks to the number of more than five hundred. There is no service too hard for Peacock Brakes. They have made many of their *best* records on steep grades, controlling heavy cars in the densest traffic. So, even if actual service had not already proven it, you can clearly see that they can do even better on the lighter cars they are building today.

The kind of service Peacock Brakes are rendering in Cincinnati is not the result of chance but of a long period of specialization and co-operation with our customers in every aspect of electric car braking.

When you write "Peacock Brakes" into your specification, you are assured that you will get the greatest possible amount of braking protection per dollar spent.

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*Cincinnati, Ohio . . . . Union Trust Building*
*Atlanta, Ga. . . . . . Candler Building*
*Cleveland, Ohio . . . . Guardian Building*
*Detroit, Mich. . Beecher Ave. & M. C. R. R.*
*CHICAGO, ILL. . 208 South La Salle Street*
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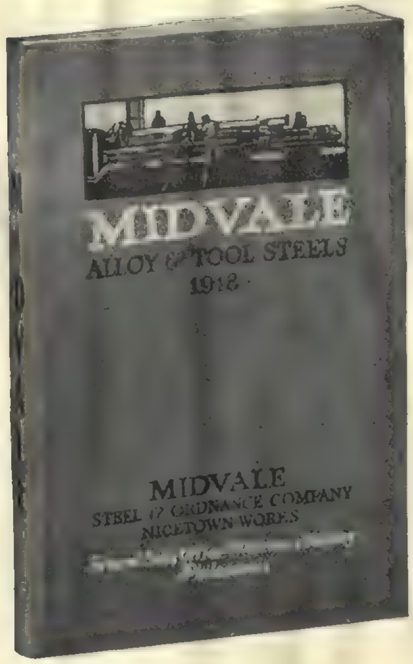

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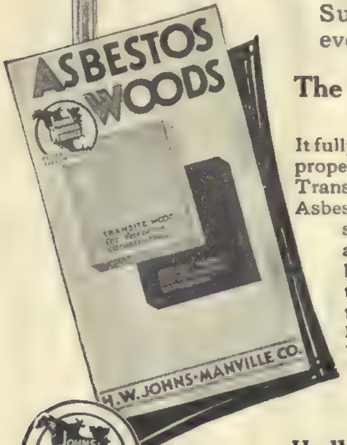

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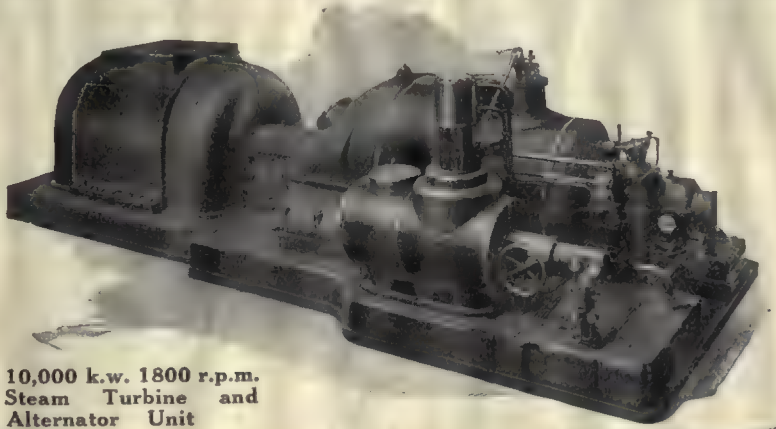

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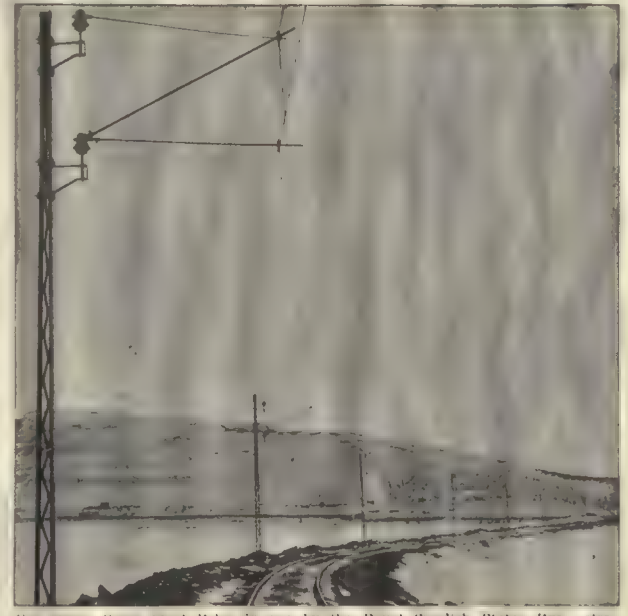

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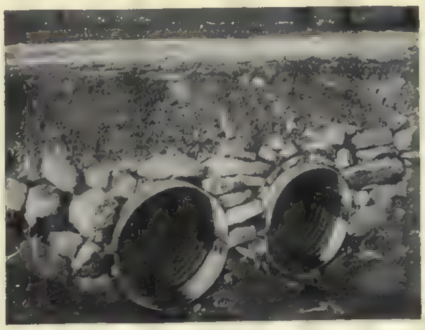

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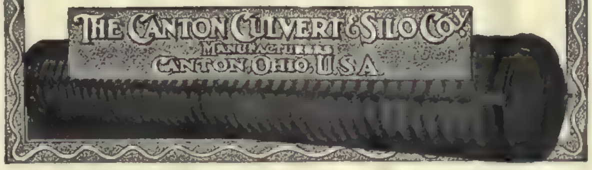

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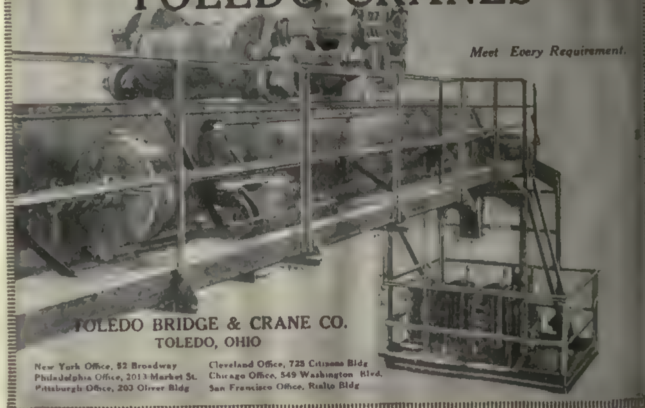

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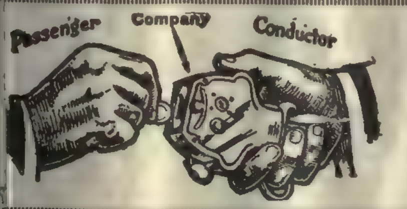

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Our power-saving bulletins will vitally interest you right now. Ask for them.

**Economy Electric Devices Co., Chicago**

## WE CAN CUT YOUR COST OF HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

**GOLD**

ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
THERMOSTATS Save Current.
ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.
ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

**Gold Car Heating & Lighting Co., 17 Battery Pl., New York**

---

## Holden & White Inc.

**Electric Railway Sales Distributors for:**

Anderson Brake Slack Adjusters.
Garland Ventilators. Miller Trolley Shoe.
Perry-Hartman Center Plates and Side Bearings.
Jewel Hot Blast Heaters.
Wasson Air-Retrieving Trolley Bases (U. S.).
Reliance Air Sanders. Air Rectifier.

**Chicago District Representatives for:**

Drew Line Material
Columbia Car & Shop Equipment
Earll Trolley Catchers and Retrievers

**817 Fisher Building CHICAGO**
*Branch Office—2213 Dime Bank Bldg., Detroit*

---

## MORE-JONES

Armature Babbitt Metal is unusually long wearing and eliminates the tremendous expense of frequent rebabbitting.

Designed particularly for electric railway armature bearing service, and recognized the world over for unexcelled quality.

## BABBITT METAL

**More-Jones Brass & Metal Co.**
St. Louis, Mo., U. S. A.

---

## The Trigger-Lock Reversible Controller Finger

saves Labor, Time and Money. Used as standard on

**200 Roads**

*U. S. Factory*
814-8 Bath Ave.
**Niagara Falls, N. Y.**

*Canadian Factory*
557 King St., West.
**Toronto, Canada**

---

## 32,680 MILES

was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

## U S G Brushes

are especially designed for the service in which they are to operate.

**THE UNITED STATES GRAPHITE COMPANY**
Saginaw, Michigan, U. S. A.
Branch Offices: New York, Pittsburgh, Philadelphia, Atlanta, Chicago, St. Louis, Denver, San Francisco.

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## WHAT HAVE YOU

For Sale
For Rent
For Exchange

?

Practically every worth-while dealer can be reached through this One Dominant Paper.

*Let the Searchlight Help YOU*

82

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## PYRAMID BRUSHES

—Not only a faithful study of the electric railway industry,

—Not only a completely equipped laboratory to design and direct the manufacture of the product,

—Not only a rigid selection of raw material,

—Not only careful inspection during and after the process of manufacture,

But all these things combined are responsible for the high quality of Pyramid Brushes.

NATIONAL CARBON COMPANY, INC.
Cleveland, Ohio.

---

## PROVIDENCE H-B

FENDERS LIFE GUARDS

**The Consolidated Car Fender Co., Providence, R. I.**
*Manufacturers of* The Providence Fender and H-B Life Guard
**Wendell & MacDuffie Co., 61 Broadway, New York**
General Sales Agents

---

**Use them in your terminals—**

## PEREY TURNSTILES or PASSIMETERS

*Faster than the ticket seller*

**Perey Manufacturing Co., Inc.**
30 Church Street, New York City

# *Get Your Wants into the Searchlight*

## ADVERTISING RATES

### Ads Set in Uniform Style

*(Solid, in one paragraph, without display.)*

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent, if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted
Evening Work Wanted
Vacation Work Wanted
Salesman Wants Connections

**FIVE CENTS A WORD**, minimum charge $1.50 an insertion, for advertisement under:

Agencies Wanted
Agents Wanted
Business Opportunities
Desk Room for Rent
Educational
Employment Agencies
Desk Room Wanted
Foreign Business
Positions Vacant
Partner Wanted
Representations Wanted
Salesmen Wanted
Patents for Sale
Plants for Sale
Sub-Contracts Wanted
Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

### Ads Set in Display Type

*(Individual space, within border rules).*

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the *total* number of inches to be used - that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space in 4 issues, or a inch space one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

| | | | |
|---|---|---|---|
| 1 to 3 in., | $3.00 an in. | 15 to 26 in., | $2.70 an in. |
| 4 to 7 in., | 2.90 an in. | 27 to 49 in., | 2.60 an in. |
| 8 to 14 in., | 2.80 an in. | 50 to 99 in., | 2.50 an in. |

Rates for larger space furnished on request.

*For quick and satisfactory results*
*tell the reader everything that*
*he will want to know*

## INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave., New York
1570 Old Colony Bldg., Chicago
657 Leader-News Bldg., Cleveland
935 Real Estate Trust Bldg., Philadelphia
501 Rialto Bldg., San Francisco
519 Newhouse Bldg., Salt Lake City, Utah

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office of a post-office box number in your city.

POSITIONS VACANT

# EMPLOYMENT

POSITIONS WANTED

## POSITIONS VACANT

OUNTANT, age 25 to 35, energetic, ith a good knowledge of theory and ractice; thoroughly conversant with reet railway work particularly, and miliar with the preparation of reports public authorities. Salary, $1800 per nnum, with opportunity for advanceent. P-420, Elec. Ry. Journal.

### WANTED

—Air Brake Repairman,
—Air Brake Inspector,
—Controller Repairman,
—Electrical Repairman and Inspector, for day work,
—Electrical Repairman and Inspector, for night work,

r an Electric Railway property operting 75 cars in an Eastern city. In plying, state previous experience.

P-419, Elect. Railway Journal,
10th Ave. at 36th St., N. Y. City

### ELECTRIC RAILWAY EXECUTIVE

ere is an opportunity open in a large advering service department for a man familiar with ditions existing in the electric railway industry, the equipment bought and used, to capitalize n his experience and become a trained advering man with good chances for future developnt; his job will be planning and writing adtising copy for a leading technical publication ering the electric railway field; his work will creative and interesting; he will enter upon a e of endeavor which offers a growing future; hnical advertising writers in specialized fields in demand; we can use the right man immetely; let your letter cover your experience fully.

P424 Elect. Railway Journal,
10th Ave. and 36th St., N. Y. City.

## POSITIONS VACANT

ASSISTANT superintendent of transportation wanted by a large City Property in the Midwest. Must be familiar with schedule making, traffic survey and the details of handling transportation. Write fully all necessary information and salary received. Confidential. P-411, Elec. Ry. Journal, Chicago.

DRAFTSMAN wanted, experienced in calculating and designing street railway special track work. State salary and experience. The Buda Co., Harvey, Ill.

MASTER mechanic wanted between the ages of 30 and 40 years, by railway in middle west operating 30 cars. Must have conception of keeping records pertaining to costs and life of material used. P-402, Elec. Ry. Journal, Chicago.

SHOP foreman wanted for small system in Northern Alabama. Young married man with some experience as armature winder and electrician preferred. Excellent opportunity for rapid advancement to ambitious man. State fully age, previous experience and salary expected. P-409, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

## POSITIONS WANTED

AUDITOR solicits change; 13 years' experience in street railway accounting; age 35; married; references. PW-416, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

CAPTAIN Signal Corps, graduate engineer, now n New Yorik awaiting discharge, desires connection where wide acquaintance with the managements of electric railway and central station companies of Middle West and thorough knowledge all phases of those industries would be valuable. PW-421, Elec. Ry. Journal, Phila.

## POSITIONS WANTED

MANAGER-ENGINEER leaving Government service is seeking responsible executive position with Public Utility Corporation, Engineering Company, or Commercial Company where personal ability, experience and initiative will be recognized. Have had wide business and engineering experience in the Electric Railway Industry and thoroughly skilled in handling public relations and industrial matters. Ability, reputation and character above reproach. Have wide personal acquaintance in electric railwav industry as experienced sales manager. Highest references furnished. Personal interview solicited. PW-407, Elec. Ry. Journal.

MASTER mechanic or general foreman. Age, 37; married; will be open for position after June 15; over 18 years with one company; the last three years as master mechanic. Willing to go anywhere. Best references. PW-422, Elec. Ry. Journal.

### General or Publicity Manager

available. Experienced in the technical, commercial and practical sides of electric railroading. **Understands Public Psychology.** Age 35.

PW397—Elec. Railway Journal
935 Real Estate Trust Building
Philadelphia, Pa.

### In Replying to "Blind" Ads

be careful to put on envelope the key number in the ad. and also local address of office to which reply is sent.

10th Ave. at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
657 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
501 Rialto Bldg., San Francisco.

**Important**

Original letters of recommendation or other papers of value should not be enclosed to unknown correspondents—send copies.

## POSITIONS WANTED.

POSITION as traffic or schedule man or special investigations; 36 years old; married; technical graduate; 10 years' experience, including overhead, power and transportation departments. Best references past employers. PW-415, Elec. Ry. Journal.

## AGENTS AND SALESMEN

**Do You Want Representation in Manchuria?** Advertisers are invited to communicate with Messrs. Fukusho Company, Dairen, Manchuria, who are interested in all kinds of machine tools, engineering requirements and railway materials. If not already represented in Manchuria, Fukusho Company invite correspondence with this end in view. Advertisers are requested to forward catalogues, prices and terms offered.

IF you want your

**LETTERS**

to box number advertisers

**TO BE DELIVERED**

to our offices

**PROMPTLY**

the envelopes

**MUST HAVE**

not only the city but also the

**LOCAL ADDRESS**

Otherwise they may be delayed through delivery to the wrong branch Post Office.

*The local addresses of McGraw-Hill offices are:*

10th Ave., at 36th St., New York.
935 Real Estate Trust Bldg., Phila.
657 Leader-News Bldg., Cleveland.
1570 Old Colony Bldg., Chicago.
501 Rialto Bldg., San Francisco.

0050

WANTED

## OIL SALESMAN

A large corporation has need for an oil salesman to handle lubricating oils in the steam and electric railway trade.

He should be preferably a graduate engineer, who has had practical experience in locomotive and car shops, or at least has a good knowledge of shop conditions.

He must have had previous selling experience or be able to demonstrate sales ability. State qualifications in detail as to education and experience.

AS418-Electrical Railway Journal
935 Real Estate Trust Bldg., Phila., Pa.

**FOR SALE**

Sixteen 33-in.

**Rolled Steel Wheels**

3-in. tread, 7/8-in. flange.

Also eight 67-tooth

**Grade M Gears**

and eight 17-tooth

**Grade M Pinions for GE-203-P Motors**

*This material is new and has never been used.*

**Gary & Valparaiso Railway Co.**
Gary, Indiana

FOR SALE

## 4 Wason Paye Cars

28 ft. over corner posts
Standard O-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**
Commonwelth Bldg., Philadelphia, Pa.

**WANTED**

- 2—K-6 and 2—K-10 G. E. Controllers, in good operating condition.
- 1—Drew Electric Shovel, suitable for gravel bed.
- 1—Second-hand Car Wheel Lathe, in good operating condition, for use with 37-in. Rolled Steel Wheels.
- 1—Storage Tank, for lubricating oil—1000 gal. capacity.
- 1—Set Triplex Falls Yale & Towne make, Model 1898, 1-ton capacity.

**FOR SALE**

- 1—Buckeye Electric Blueprinting Machine.
- 10—W. E. & M. Co. Type 250-C Switch Groups, in good operating condition.
- Various Repair Parts (New), G. E. Type M Control.
- 1—L-4 Controller, in good condition.
- 2—L-14 Controllers, in good condition.

**Rochester & Syracuse Railroad Co., Inc.**
Purchasing Agent, Box 51, Syracuse, N. Y.

## WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc Remember our initials stand for our product.

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

FOR SALE

## SURPLUS MATERIAL AND EQUIPMENT

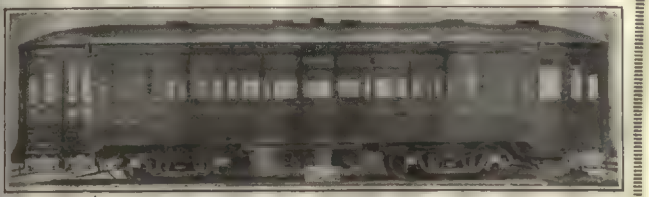
All classes of ship construction and Shipyard Plant Construction equipment and material including large quantities of

Wood Working Machinery
Machine Tools and Fixtures
Electrical Machinery
Boiler Shop Equipment
Forge Shop Equipment
Marine Equipment and Accessories
Air Compressor Equipment
Contractors Equipment and Supplies
Bridge and Gantry Cranes
Steel Plates, Shapes and Bars
Pumping Machinery
Scrap Metals
Lumber
Deck Equipment
Galley Equipment

All parties interested in the purchase of any of the foregoing classes of material will receive formal invitations to bid periodically as the material is available if they will promptly request that their names be placed on mailing lists for the items in which they are interested.

**SALVAGE—UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION**
140 North Broad Street, Philadelphia, Penna.

*Get your Wants into the Searchlight*



## *IMMEDIATE DELIVERY*

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4 G. E. Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**
**111 West Monroe Street, Chicago, Ill.**
*Cars and Trucks, Snow Sweepers, Electric Locomotives*

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## ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
*Telephone* 4337-4338 *Rector*

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S
EARCHLIGHT
ERVICE
ECURES
ATISFACTORY
ITUATIONS
ALES

816

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## Turbo-Generator Units

### 60 CYCLE

10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

### 25 CYCLE

6500 Kw. Allis-Chalmers Horizontal Turbo Generator Unit, 3-phase, 25-cycle, 6600 volts, 4 pole, 750 RPM. Send for full details and specifications.

***We have these units in stock for immediate shipment. We own them and are not acting as brokers.***

**MACGOVERN & COMPANY, Inc.**
**114 Liberty Street, New York, N. Y.**
**Pittsburgh Office, 498 Union Arcade Building**

---

## Cars, Rails, Locomotives, Cranes, Generators, Turbines, Motors, Machine Tools, Hammers, Presses

Everything For
POWER, RAILROADS, INDUSTRY, CONTRACTORS

What do you want to Buy or Sell?
Write for our Bulletin No. 119.

***Our ENGINEERING DEPARTMENT will Design, Construct and Finance your undertakings. Send us particulars.***

**RAILWAY & POWER EQUIPMENT CO.**
Woolworth Bldg., New York, N. Y.
Cable Address: "Johnsear" Code, Western Union.

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FOR SALE

1—New Thompson

## Recording Watt Meter

Type M, Form G-2, Class 2500 ampere, 550-volt, made by General Electric Co.

**E. E. KRETSCHMER, Purchasing Agent**
Chicago Elevated Railroads
1347 Edison Bldg., Chicago, Ill.

---

## RAILS

**15,000 TONS—NEW and RELAYERS**
**NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.**
**RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.**

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

**L. B. FOSTER COMPANY**
Park Building, Pittsburgh, Pa.

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## CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

***Get our List and Prices.***

**J. F. DONAHOO CO., Birmingham, Ala.**

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## *FOR IMMEDIATE SHIPMENT*

**75 tons of 6-in., 62-lb. Shanghai Relaying Rail, practically as good as new, with angle bars to match. Wire for quotation.**

**Also all other sections of Standard Relaying Rail and a lot of Steel Girder and Deck Plate Bridges.**

**M. K. FRANK, Frick Bldg., Pittsburgh, Pa.**

---

FOR SALE

## RAIL BONDS

**260—New 4/0 Flexible Copper Protected Type P-4—⅞ x ⅞ inch press terminal 32 inches long. A bargain, apply to**

**LYKENS VALLEY RAILWAY CO.**
417 East Market St., Williamstown, Pa.

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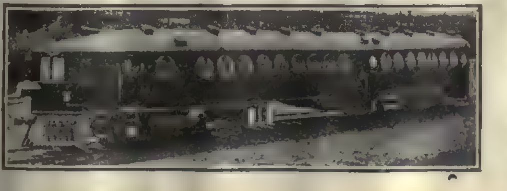

We own and offer for sale a used McKeen Motor 71-Passenger Car, all steel. In first class condition. Write or wire us for further information.

## HYMAN-MICHAELS CO.

**People's Gas Building, Chicago**
**Phone: Harrison 1100**

***New and Relaying Rails*** ***BUYERS OF ABANDONED RAILROADS***

---

FOR SALE

## 80-LB. NEW SHANGHAI RAIL

### *At Attractive Price*

Specially adapted for brick or asphalt paving. Let us have your inquiries, for above, or any weight rail, new or relayers.

***Our Prices Are Right***

**THE WILKOFF COMPANY**
**First National Bank Bldg., Pittsburgh, Pa.**
*Office and Yards:* Youngstown, Ohio
*New York Office:* Woolworth Bldg.

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Rectifiers**
Holden & White, Inc.

**Ammeters**
Weston Elec'l Instrument Co.

**Anchors, Guy**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers**
Railway Improvement Co.

**Ash Storage Tanks, Cast Iron**
Green Engineering Company

**Automobiles and Buses**
Brill Co., The J. G.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Carnegie Steel Co.
General Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
Ajax Metal Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Batteries, Dry**
Johns-Manville Co., H. W.

**Batteries, Storage**
Electric Storage Battery Co.

**Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
Holden & White, Inc.

**Bearings, Roller and Ball**
Gurney Ball Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

**Boilers**
Babcock & Wilcox Co.

**Boiler Cleaning Compounds**
Johns-Manville Co., H. W.

**Boiler Coverings**
Johns-Manville Co., H. W.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.
Lincoln Bonding Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Lincoln Bonding Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Bond Testers**
Lincoln Bonding Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters**
Holden & White, Inc.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

**Brazing and Welding Processes**
Lincoln Bonding Co.

**Bricks, Fire**
Green Engineering Co.

**Bridges and Buildings**
American Bridge Co.

**Brooms, Track, Steel or Rattan**
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
National Carbon Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite**
United States Graphite Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Buckets**
Blaw-Knox Company

**Bunkers, Coal**
American Bridge Co.

**Bushings, Case Hardened & Manganese**
Bemis Car Truck Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper**
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Electric Service Supplies Co.
Holden & White, Inc.
Kerschner Co., Inc., W. R.
Ohio Brass Co.
Wood Co., Chas. N.

**Circuit Breakers**
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn & Dutton Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders**
Railway Improvement Co.

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
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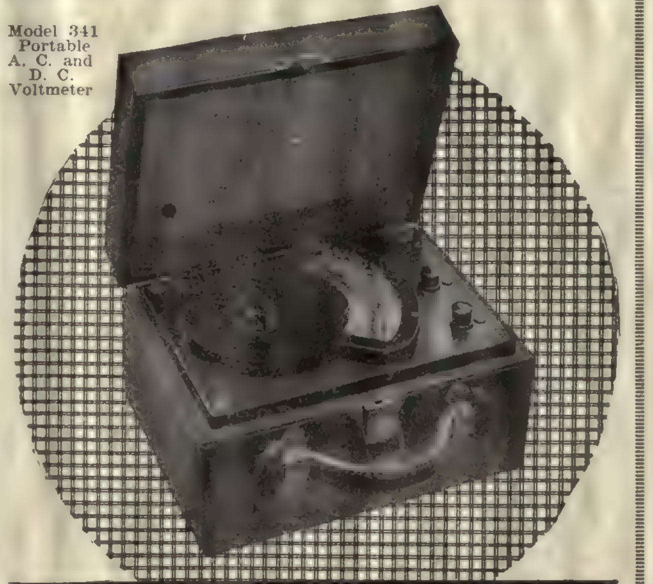

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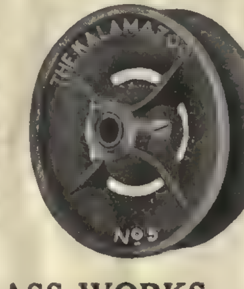

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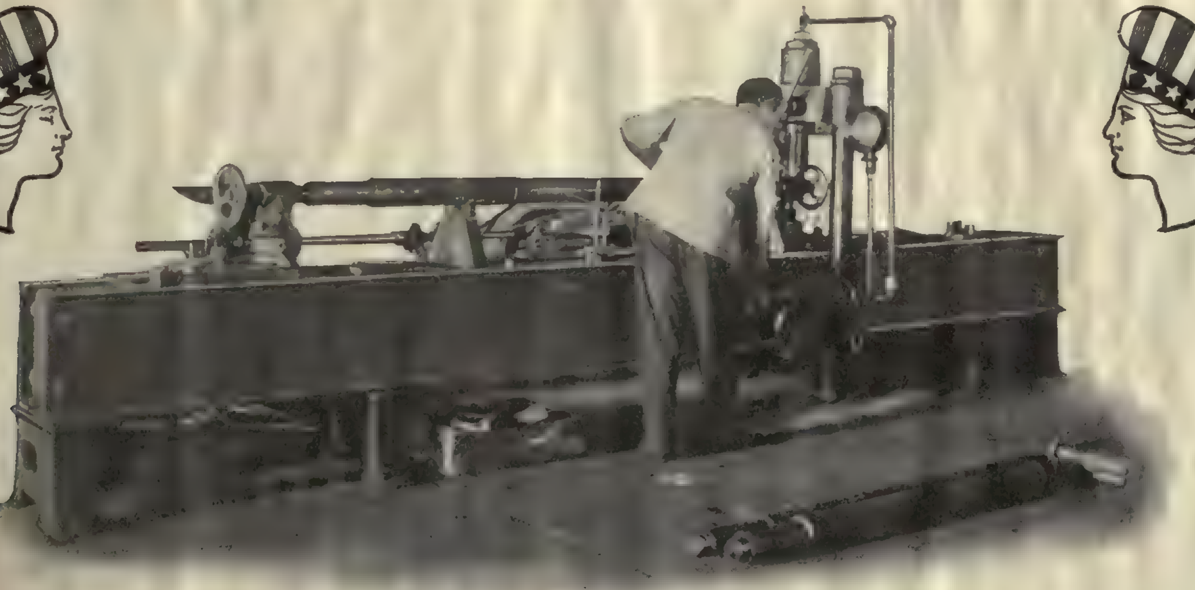

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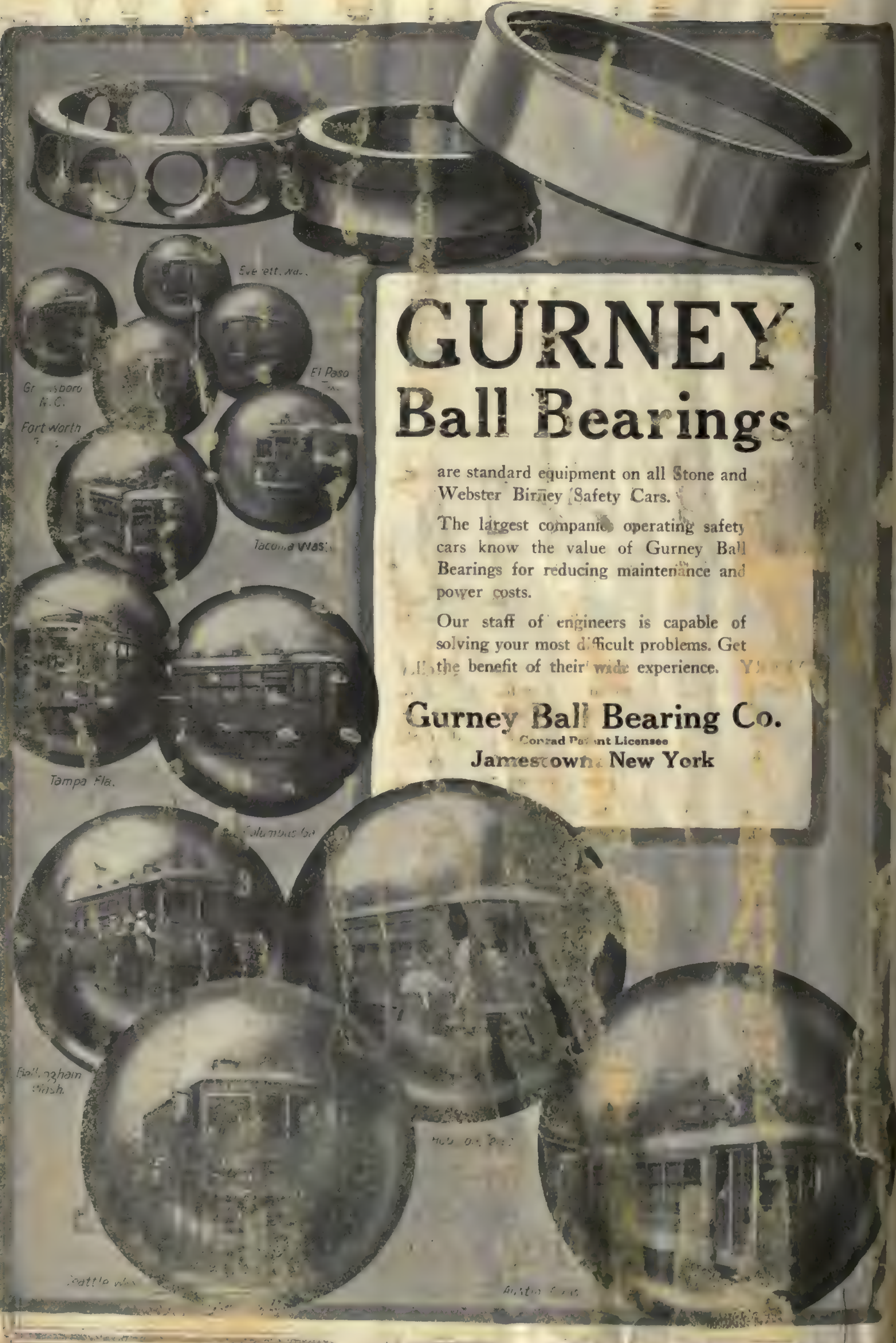
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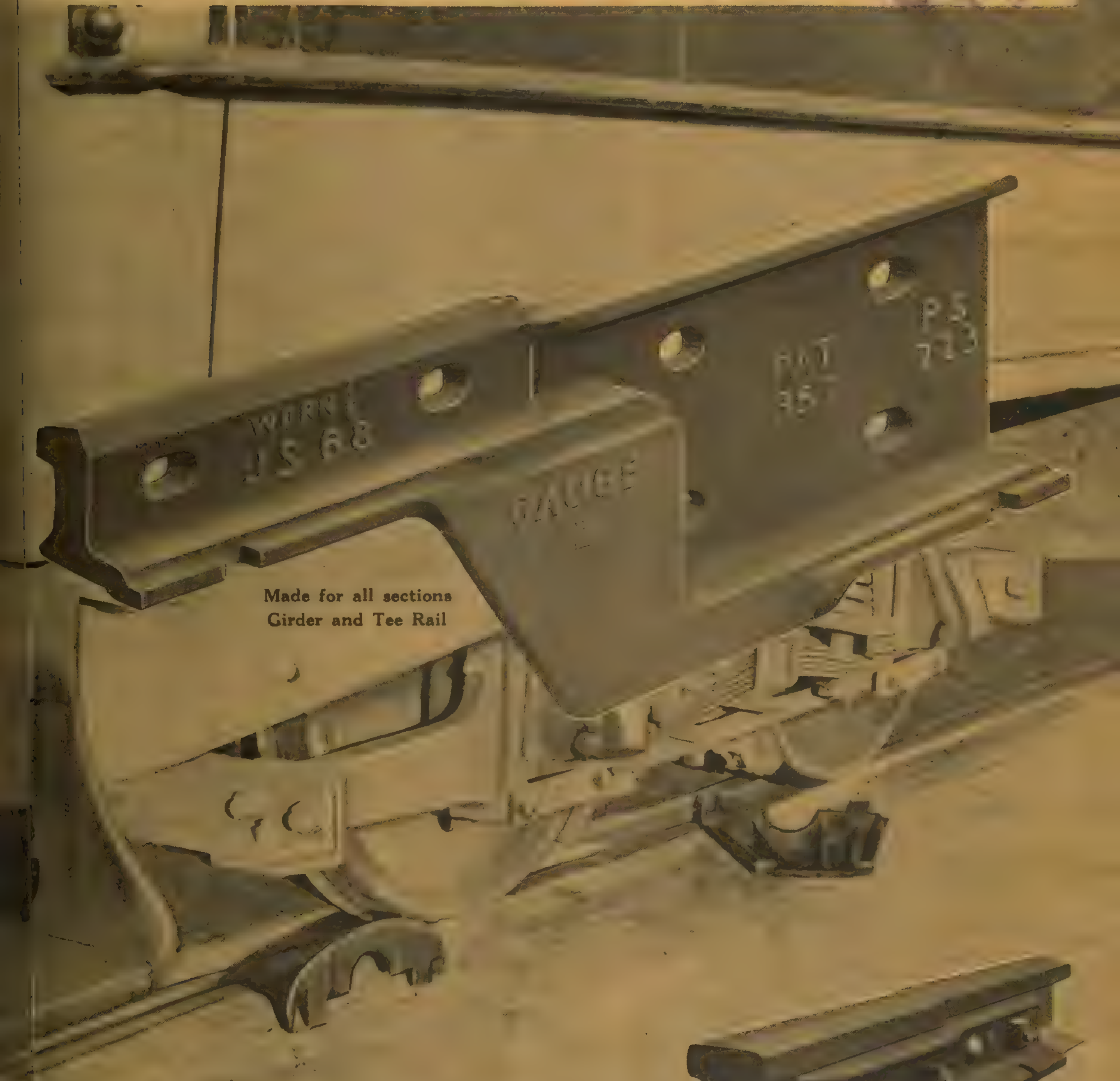

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W WESTINGHOUSE ELECTRIC

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*Vol. 53, No. 23* New York, June 7, 1919 *Pages 1079 to 1130*

# Electric Railway Journal

H. W. BLAKE, *Editor*

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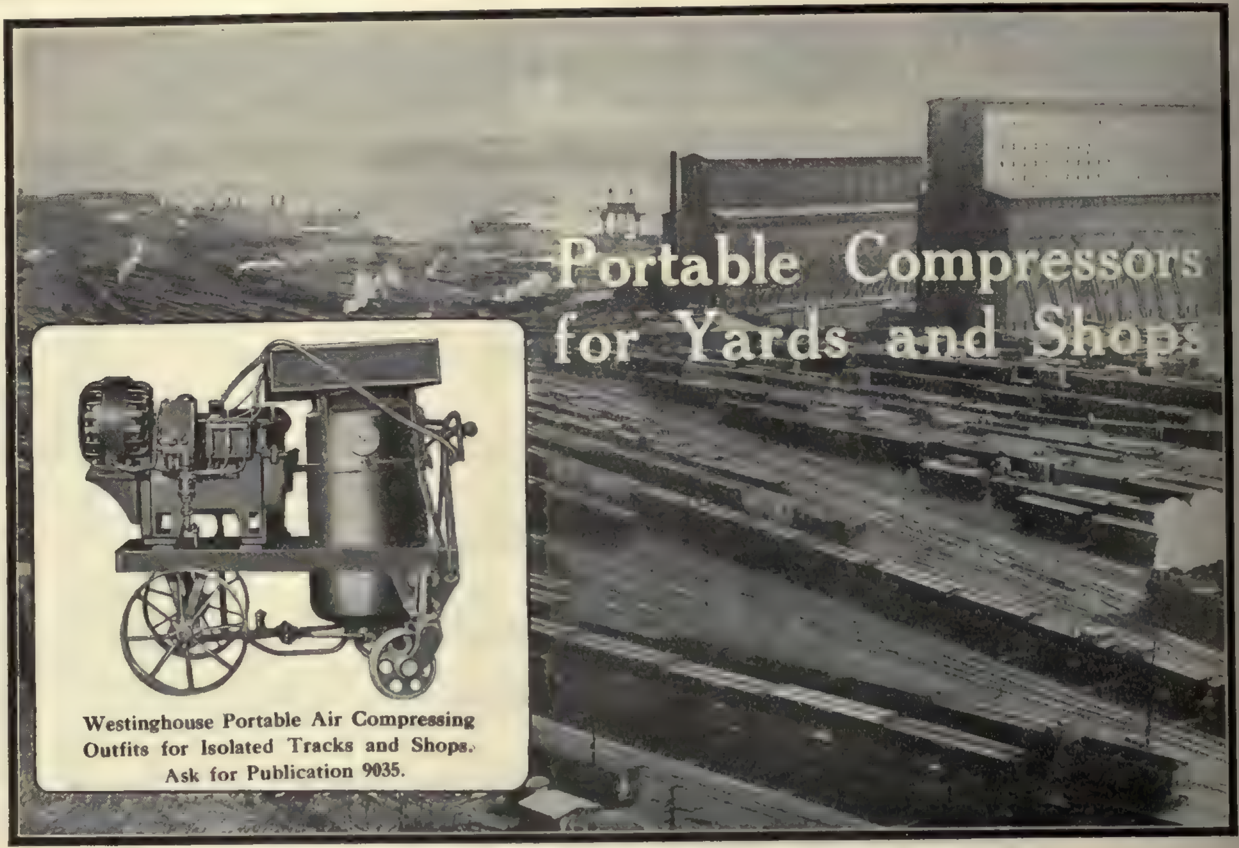

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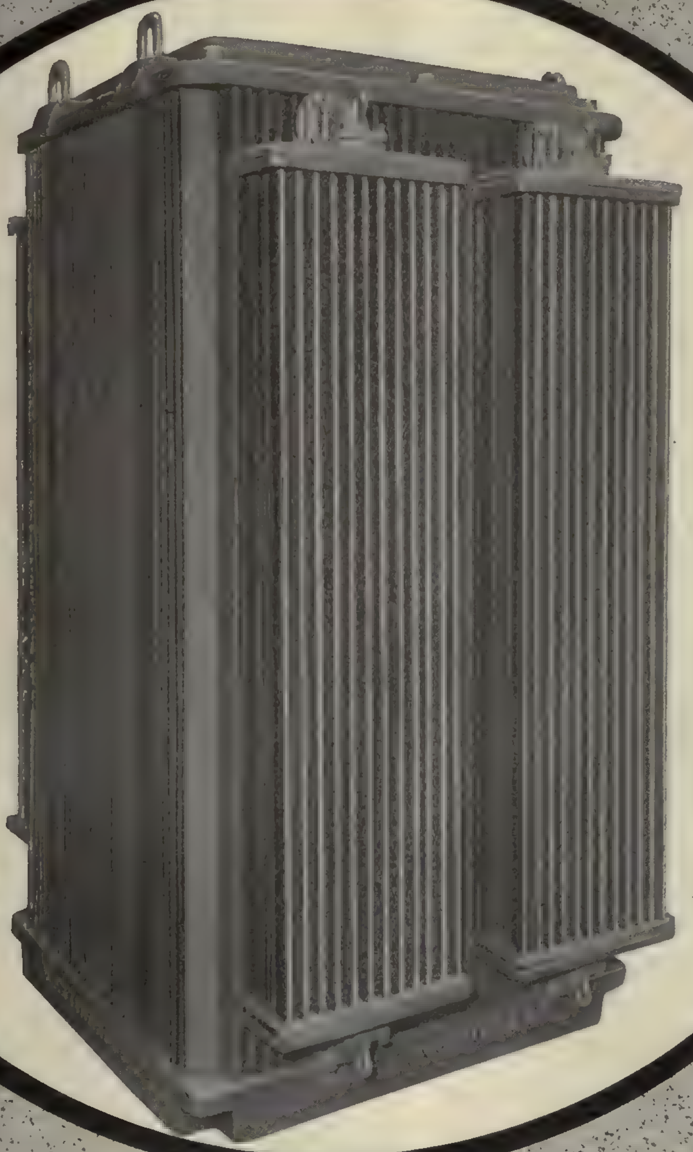

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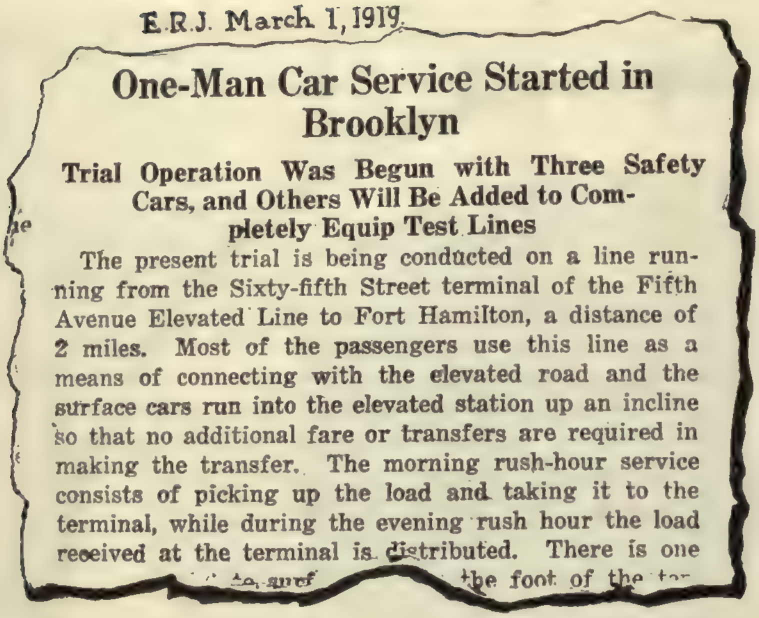

E.R.J. March 1, 1919.

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the foot of the ter

# The Victorious Invasion of the Safety Car in Brooklyn

## —and the Population of Brooklyn is 2,000,000

Now the *large cities* are steadily falling into the line of safety car operation. Why just the advance guard alone in the case of the Brooklyn Rapid Transit System has proved so convincing that the company is planning to purchase many more safety cars for use on lines in the outlying sections and elsewhere.

The safety car is fast becoming the standard car for heavy as well as light traffic conditions. Safety Car Control Equipments enable them to operate with shorter headway, increased mileage, lower operating and maintenance costs and absolute safety to passengers.

*Let one of our experts survey your system and advise where you can use the safety car to advantage.*

**IT IS A SAFETY CAR ONLY**

When equipped with automatic laborless apparatus, so interlocked, that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

# SAFETY CAR DEVICES CO.

Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.

CHICAGO
Railway Exchange Building

NEW YORK
City Invest. Building

PITTSBURGH
Westinghouse Building

CANADA: Canadian Westinghouse Co., Ltd., Hamilton, Ont.

**O B PRODUCTS**

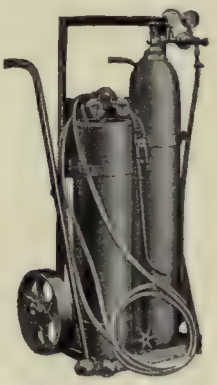
*Quality First*

# More O-B Service for Gas Weld Users

This company is now a distributor of all Prest-O-Lite welding and cutting equipment and supplies except gas.

A large stock of apparatus, repair parts and welding supplies of all kinds is on hand at Mansfield.

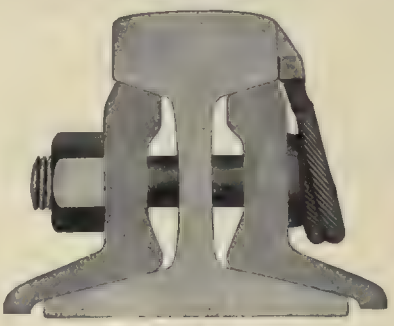
Primarily this new arrangement is for the convenience of O-B Gas Weld users. But the same apparatus is used for general shop welding purposes—for keeping costly parts out of the scrap heap—for making quick emergency repairs.



Gas Weld equipment can be mounted in several handy ways.

## O-B Gas Weld Bond Was Pioneer

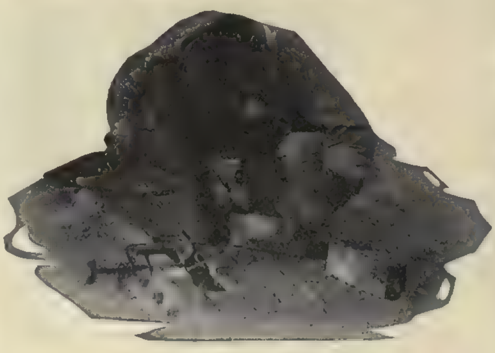
Three years after the first commercial installation of O-B Gas Weld Bonds an investigation showed that all the bonds were as good as the day they were put on.



Section of O-B G W Bond on rail Notice beveled shape of terminal.

Today O-B Gas Weld Bonds still lead. Their installation is easy—their union with the rail permanent and of low resistance.

*Send for "Gas Weld Bonding"*



Installing O-B Gas Weld Bond on paved track.

## The Ohio Brass Company

Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco

# *Be Sure to Specify Rome Wires and Cables*

—not only because of the excellence of these products but because of the service you are sure to get—and Rome Service as well as Rome Wire has a reputation distinctively individual. For instance—send in an inquiry—an executive of the Company who is vitally interested in its welfare will respond—send in your **order**—an executive will see that it receives proper attention—frequently order is filled from stock. Rome shipping facilities include steam and electric railroads—extensive sidings and barge canal—and Rome Service means prompt delivery—This executive supervision over all departments assures maximum satisfaction.

We are in position to guarantee accuracy of gauge, proper annealing and uniformity of tinning of Rome Wires and Cables. Specify Rome Wires and Cables in making your improvements.

**Rome**
**Wire Company**
*Rome, N. Y.*

***All Operations from Wire Bar to Finished Product in this Plant.***

Concreting 1330 ft. of Track Daily
with

# INTERNATIONAL
## STEEL TWIN TIES

200 cubic yards of concrete are being mixed and placed in 10 hours by a gang of twenty-five men on a number of Street Railway properties.

Steel Twin Tie track requires only 15 cubic yards of concrete per 100 feet of track. Therefore, the gang mentioned above can concrete completely 1330 ft. of Twin Tie track in ten hours.

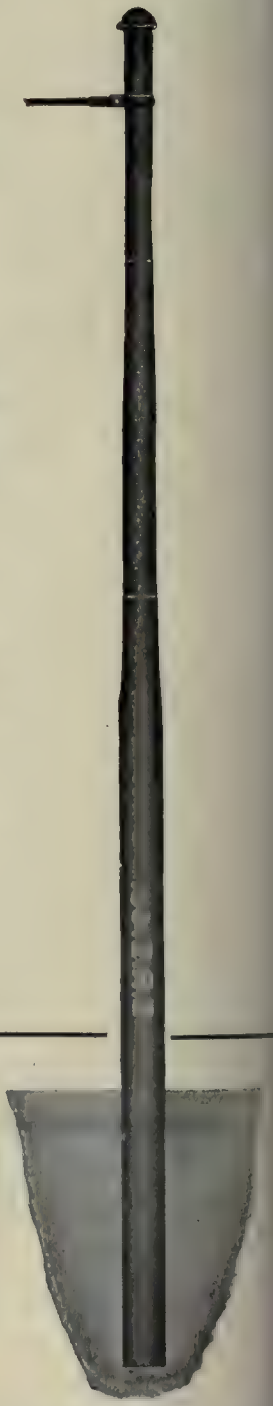
Steel Twin Tie economies solve the vital problem of saving money on enforced construction with labor and materials at high price levels. Get full particulars before you lay any track.

# THE INTERNATIONAL STEEL TIE COMPANY

Manufacturers of Steel Twin Ties and Crossing Foundations
GENERAL SALES OFFICE AND WORKS: CLEVELAND, OHIO

# This Book Contains Useful Data on Pole Engineering

MANY engineers use this handy catalog exclusively for reference in regard to engineering data on poles for electric railway work. Technical schools use it. The data and tables given are absolutely reliable.



## Turn to Page 17 of this Catalog

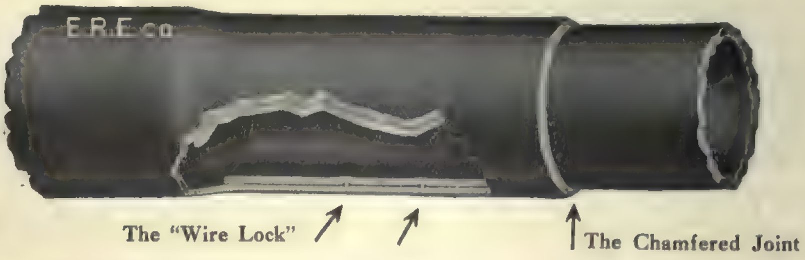
and you can find the correct size pole — the pole that will best answer your special purpose — without guesswork or unnecessary calculations.

It also gives the exact amount of rake necessary to set any pole, which will permit pole to pull up vertical under full load.

Contains valuable information and recommendations compiled by Committee on Power Distribution, American Electric Railway Association. Facts for the engineer, purchasing agent, lineman or any official of your road, who desires quickly accurate information about tubular steel poles for electric railway use.

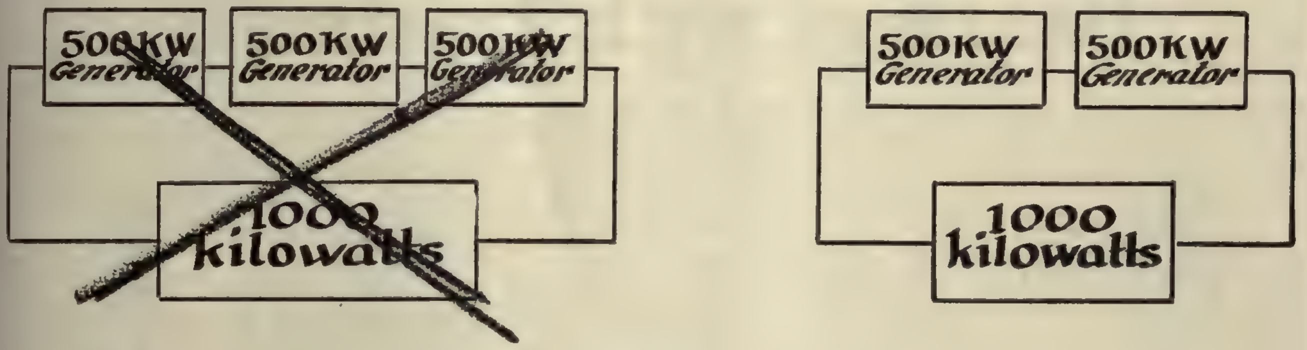
*Write today for this reliable handbook. Ask for Catalog No. 16*

**Electric Railway Equipment Co.**
**Cincinnati, Ohio**
**New York, 30 Church St.**



**Elreco Tubular Poles combine lowest cost, lightest weight, least maintenance, greatest adaptability.**

# SAVED: 500 Kilowatts



## with

# "Protected" Rail Bonds

In a large city, on one division eleven miles long, 1500 kilowatts were necessary to supply sufficient power for operation. This required the service of three 500 kilowatt generators.

When this division was rebonded, it was found that two of the 500 Kw. generators were more than ample to carry the load.

Just think of it. 500 Kilowatts continually going to waste under the old system simply to overcome the resistance of a poorly-bonded track return.

This is only *one* of the losses directly traceable to poor bonding. When voltages become lower and lower and power costs increase, test out your track return. Then let us prove to you that we can keep that voltage high and reduce your power costs with "Protected" Rail Bonds.

***The Bond with the "Shot-Over" Sleeve***

## ELECTRIC SERVICE SUPPLIES CO.

***Manufacturer of Railway Material and Electrical Supplies***

| PHILADELPHIA | PITTSBURGH | NEW YORK | CHICAGO |
|---|---|---|---|
| 17th and Cambria Streets | 335 Oliver Building | 50 Church Street | Monadnock Building |

# Replace Your Worn Center Bearings with Hartman

**Raceways That Don't Pit**

**Increase Life of Wheels**

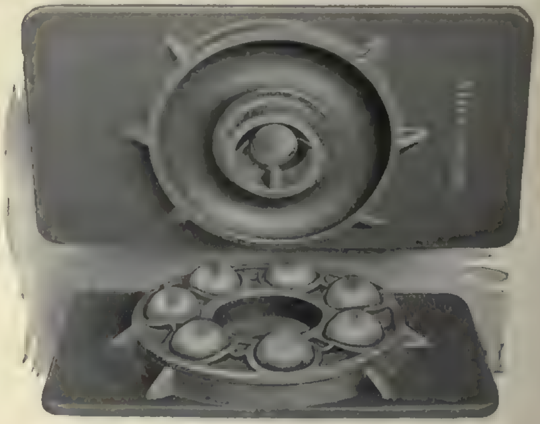
**Will Fit Almost Any Truck**

**Are Self-Centering**

Undoubtedly you have cars with worn center bearings—either plain or anti-friction. Why not try out some Hartman self-centering plates on these cars?

You will find that they about double the life of wheels, cutting in half the cost of renewals and removals for grinding. They reduce truck nosing and decrease power consumption on curves. The shape of the raceways prevents pitting and the balls are 2⅛ inches in diameter, made of forged steel.

Combined with Perry anti-friction side bearings they give you ideal truck operation. Or they can be used with ordinary friction side plates.



**Send for dimension sheets and Catalogue No. 10. We can tell from the former how to supply you with proper bearings for ready application.**

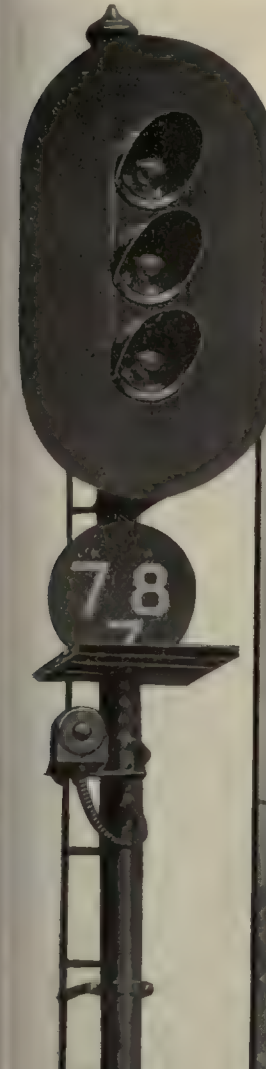
**Put Them On Your *Old* Cars**

**Holden & White Inc.**

**Electric Railway Distributors for The Joliet Railway Supply Company**

**817 Fisher Building, Chicago**

National Rwy. Appliance Co., New York, Washington; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles; L. Brandenburger, Salt Lake City; Holden & White, Inc., Detroit.



# UNION

## Style "L" Color Light Signals

safeguard the important freight and passenger traffic
on the entire 660 miles of the St. Paul's electrified
divisions over the Rockies and the Cascade Range.

*"Union" Standard Uniform A. C. Equipment Throughout*

Trade Mark US Trade Mark

**Union Switch & Signal Co.**

SWISSVALE, PA.

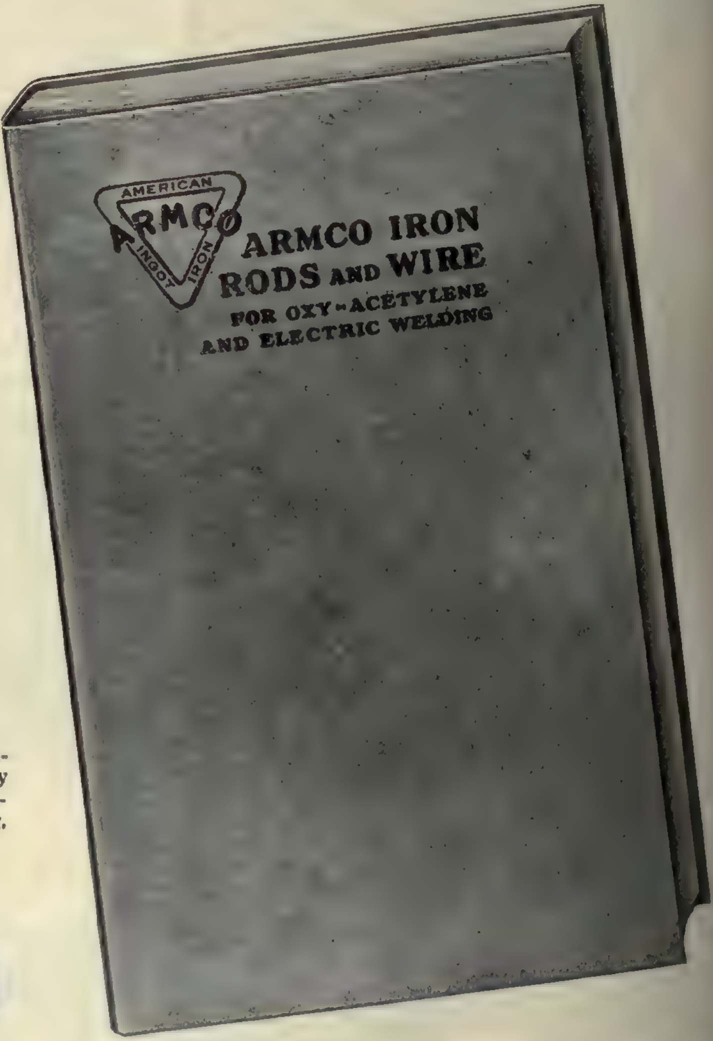
# Here's Information You Need!

## Send for your copy

In view of the modern trend toward welding as a means of labor, time and money saving, and the positive superiority of ***ARMCO IRON*** filling material, every well posted welding engineer should have this book of valuable information at hand for quick reference.

"Armco Iron Welding Rods and Wire" is not merely a catalog, but treats in a helpful way of the following subjects:

- *Requisites of a desirable filling material.*
- *Welding of mild steel and wrought iron.*
- *How and why the new American product ARMCO IRON surpasses the now unobtainable genuine Norway and Swedish irons as a welding material.*
- *How a single composition of ARMCO IRON supplants a large number of compositions of other welding materials.*
- *Analysis and physical tests of ARMCO IRON.*
- *Typical examples and illustrations of welding done with ARMCO IRON.*
- *Emergency Fleet Corporation specifications for welding wire.*
- *Microscopic study of steel and iron with reference to welding.*
- *Cost cards for keeping tab on welding jobs.*
- *Metallurgy of iron and steel, including color chart for heat treatment.*
- *Miscellaneous useful data including tables of wire gauges, conversion of temperatures from Fahrenheit to Centigrade, properties of elements and metal compositions, decimal equivalents, metric conversion tables, definitions of electrical units, mensuration factors.*



If you are a consulting, designing or managing engineer, shop superintendent or foreman, your free copy is ready for mailing on request, and the engineering advice of our welding specialists is also free for the asking.

# PAGE STEEL & WIRE CO.

*Established 1883 as Page Woven Wire Fence Co.*

STEEL AND WIRE
PAGE
QUALITY PRODUCTS

Makers of "Copperweld" Copper Clad Steel Wire; ARMCO Iron Welding Rods and Electrical Wire; Wire Mill Products, Plain and Galvanized; Wire of Special Analysis; Wire Fencing for all Purposes; Factory Gates; Ornamental Iron Fence; Machine Guards; Tool and Stockroom Partitions; Architectural Iron.

*Plants: Monessen, Pa. and Adrian, Mich.*

## Sales Offices: 30 Church Street, New York

**Western Representatives: Steel Sales Corporation, Chicago**

**Pacific Coast Representatives: American Rolling Mill Co., San Francisco**
**Canadian Distributors: Taylor & Arnold, Montreal and Winnipeg**

STEEL AND WIRE
PAGE
QUALITY PRODUCTS

Clear for the Season

—and next year

Before

After

# ATLAS "A" Weed Killer

Will clear this same track

## at 40% to 50% Less Cost

That is the Atlas "A" method. Only one application is required to clear your tracks for the season. This application costs much less than hand weeding—and the second application the following season costs 40-50% less than the first.

Atlas "A" relieves you of the whole "weedy track problem." We furnish the sprinkling equipment, superintend and take full charge and clear the track of weeds at the rate of 15 to 50 miles a day.

A detailed estimate of cost for treatment of your track by the Atlas "A" Weed Killer will gladly be made upon request.

**Chipman Chemical Engineering Co., Inc.**

**95 Liberty Street, New York**

# Phono-Electric in Bustling Houston

The installation of Phono-Electric Trolley Wire on portions of the main belt of the Houston (Texas) Electric Company is a characteristic way of introducing this long-lived, smooth-contact trolley wire.

The railway naturally puts it up first where its "Make-Good" qualities will tell soonest in comparison with copper; and where continuity of service counts more than on individual lines.

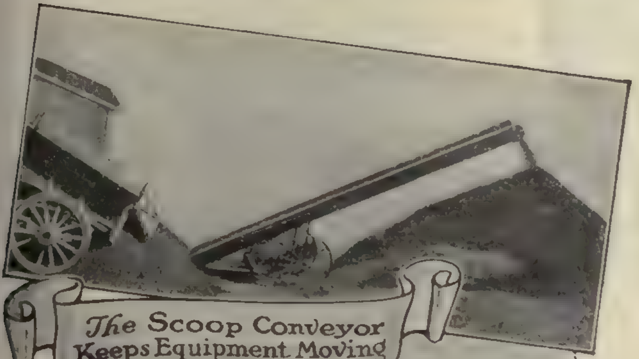
Many railways which began like Houston have since put up Phono-Electric Trolley Wire on the greater part of their mileage.

You can't lose by putting up some Phono-Electric over your heaviest lines. Thereafter you will sell yourself!

**Bridgeport Brass Company**
**Bridgeport Connecticut**

2114

# THE SCOOP CONVEYOR

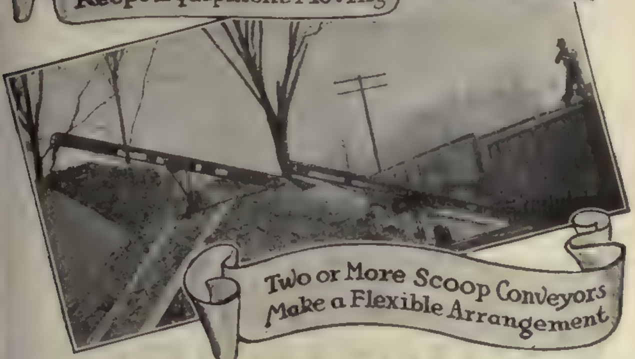


The Scoop Conveyor Keeps Equipment Moving

## Does the Work of from 6 to 12 Men

**In Storing and Reclaiming, in Loading and Unloading Cars, Trucks and Wagons. It keeps equipment moving. Enables men to work faster and easier. Eliminates much shovel and wheelbarrow work. Does three to five days work in one.**

The Scoop Conveyor has been adopted by over 1000 leading American manufacturers, electric railways, contractors and coal dealers because it is durable, compact, easily moved around and low in cost. About one-half of our sales are "repeat orders."



Two or More Scoop Conveyors Make a Flexible Arrangement

### The Scoop Is the Point

It is called "Scoop Conveyor" because the carrying belt receives its load over a scoop which can be pushed or completely buried into the material to be conveyed. This permits of scraping the material onto the carrying belt instead of lifting it by shovelfuls into the receiving hoppers fitted to ordinary portable belt conveyors and results in a saving of fifty per cent. of the labor in feeding.

Also, due to the "Scoop" it is not necessary to construct a track hopper or pit to unload hopper bottom cars. This makes it possible to unload cars quickly at any point along the track.

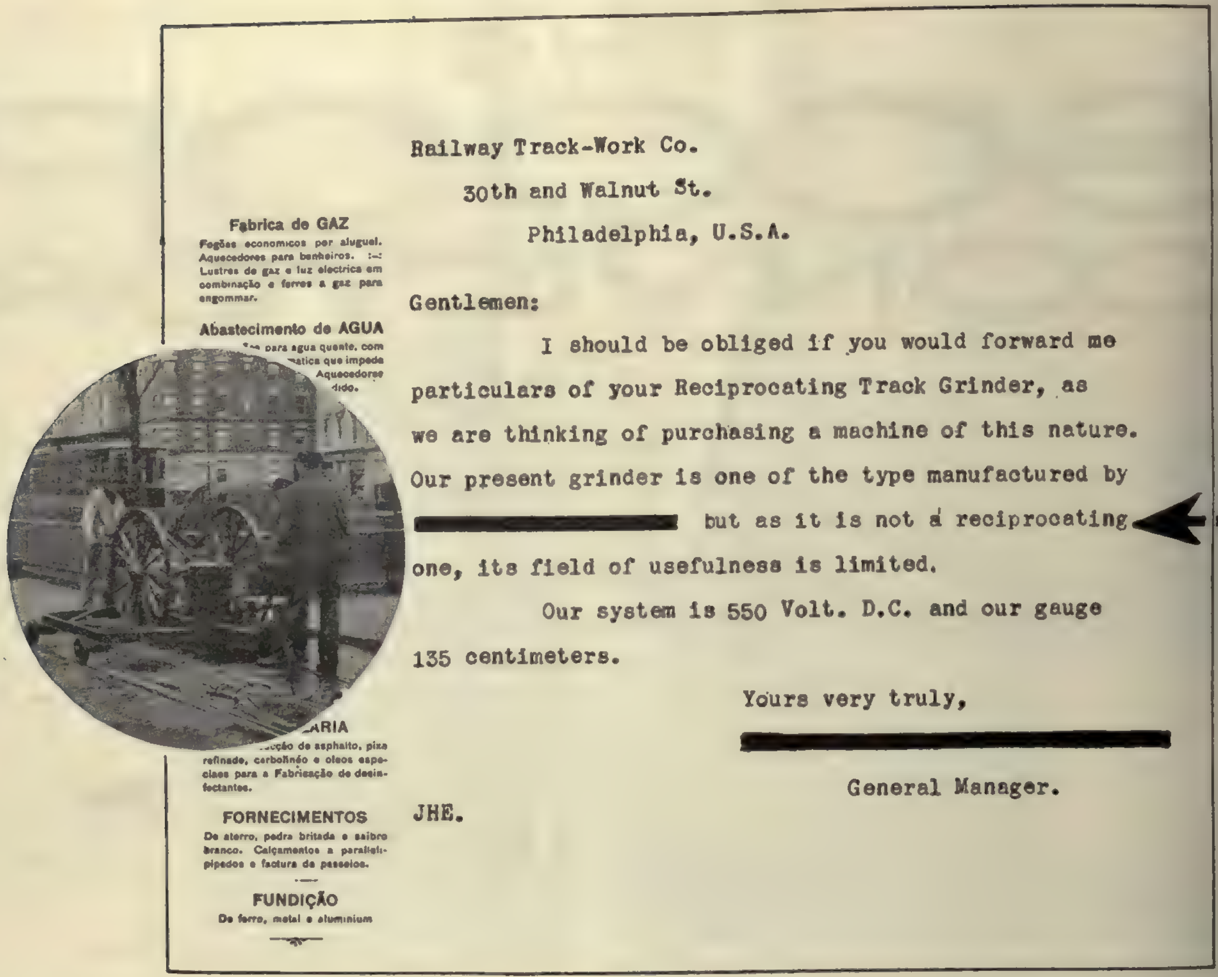
Unloading Hopper Bottom Cars Direct Into Trucks with a Scoop Conveyor

*Write for Literature.*

**PORTABLE MACHINERY CO.**
**Passiac, N. J.**

Sand, Gravel, Coal, etc., Easily Loaded with a Scoop Conveyor

Unloading Hopper Bottom Cars with a Scoop Conveyor No Track Hopper or Pit Is Necessary



**Fabrica de GAZ**

Fogões economicos por aluguel. Aquecedores para banheiros. Lustres de gaz e luz electrica em combinação e ferros a gaz para engommar.

**Abastecimento de AGUA**

para agua quente, com
atica que impede
Aquecedores
dido.

**ARIA**

ecção de asphalto, pixe refinado, carbolinéo e oleos especiaes para a Fabricação de desinfectantes.

**FORNECIMENTOS**

De aterro, pedra britada e saibro branco. Calçamentos a parallelipipedos e factura de passeios.

**FUNDIÇÃO**

De ferro, metal e aluminium

Railway Track-Work Co.
30th and Walnut St.
Philadelphia, U.S.A.

Gentlemen:

I should be obliged if you would forward me particulars of your Reciprocating Track Grinder, as we are thinking of purchasing a machine of this nature. Our present grinder is one of the type manufactured by [redacted] but as it is not a reciprocating one, its field of usefulness is limited.

Our system is 550 Volt. D.C. and our gauge 135 centimeters.

Yours very truly,

[redacted]

General Manager.

JHE.

# The Voice of Experience

If the experience of this South American company in connection with track grinders stood by itself alone it would hardly be conclusive enough to be of importance. But it is precisely the same as that of scores of electric railways in the United States who have found that the

# Reciprocating Track Grinder

is the only machine that answers the demands of every condition and does the work cheaply, efficiently and thoroughly.

You can prove this fact to your satisfaction on your own tracks at our risk.

**RAILWAY TRACK-WORK COMPANY**
30th and Walnut Streets, Philadelphia

## Reduce Your Labor Costs

Toncan Metal Corrugated Culverts are placed quickly by ordinary labor and, further, when once laid they are there to stay. Extremes of heat and cold will not damage them, floods will not loosen their ground grip, and they stand up under the most severe raffic loads.

# Toncan Metal SPC TONCAN METAL Corrugated Culverts Resist Corrosion

The reason is that those impurities which promote corrosion have been removed. The metal is of uniform density and good all the way thru. Years of use under most trying conditions have proven that there is nothing more durable made from iron ore. In SPC Toncan Metal we have a sheet manufactured specially for culverts. Every sheet is full weight to gauge and carries two ounces of alvanizing to every square foot of double xposed surface.

If you are interested in better iron and better ulverts you will be interested in our 100-page ook "Corrosion—The Cause—The Effect—The Remedy." This contains authentic information appreciated by those who want to know the reason of things. For the past several years it has been in great demand as a reference book by architects, contractors, engineers and colleges. As long as the supply lasts we will send the book with our compliments to those who request it. The demand this Spring has been exceedingly severe and we suggest an early inquiry if you are interested.

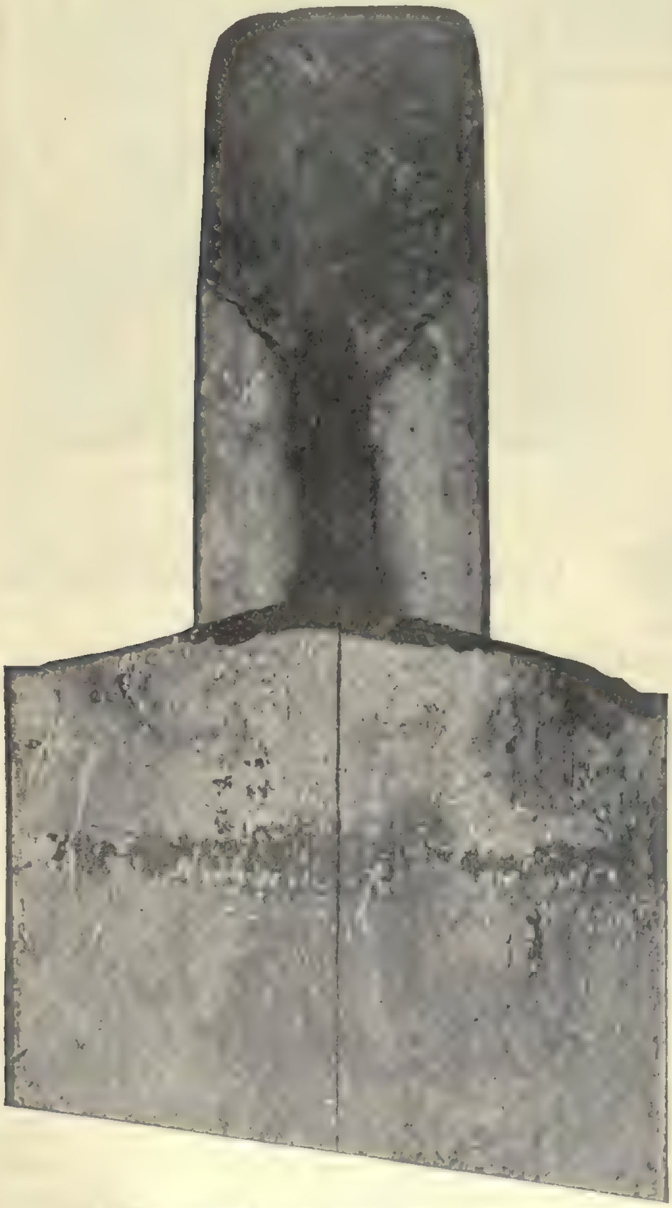
Tell us of the culvert work you have in mind and we will put you in touch with the culvert manufacturer nearest you who can supply your needs promptly. Toncan Metal Culverts are ready for immediate delivery from numerous points thruout the United States and Canada. Kindly address Department Q-21.

## The Stark Rolling Mill Company, Canton, Ohio

# Lackawanna Deseamed Rails Avoid Base Breaks

Of approximately six hundred rail failures on one division of a western road during 1910 and 1911, eighty per cent were caused by fractures starting from seams in the bases of the rails.

Coming from so high an authority, this warning ought to be heeded, especially since better and safer rails than ordinarily purchased are now obtainable.



Rail section fractured under impact from a 2800-pound test tup. Note the well-defined central seam and how it has opened up.

From the time when the railroads began to insist upon harder steel rails to prevent excessive wear, occasioned by the imposition of heavier loads than the softer steel could withstand, the principle cause of rail breakage has been what is known to the trade as "seamy bases."

This seamy condition has long been recognized as a menace and has been the subject of much study by the expert and practical men of the leading manufacturers. For years attempts have been made and processes devised intended to overcome this particular defect, but all have proven failures in practice and little if any improvement was effected until the introduction of the Lackawanna Deseaming Process.

This process is based upon the demonstrated fact that breaks from cross stresses in the base member of a rail are far less liable to occur with a surface that is smooth and without interruption of continuity than in one that has numerous seams or partings such as are found in the surface of rails manufactured by the ordinary methods. It is also evident that removal and elimination of this seamy, streaky, laminated, partially decarburized metal from the vital parts of a rail section should effect a base improvement principally in safety and a head improvement distinctly favorable to a gain in service.

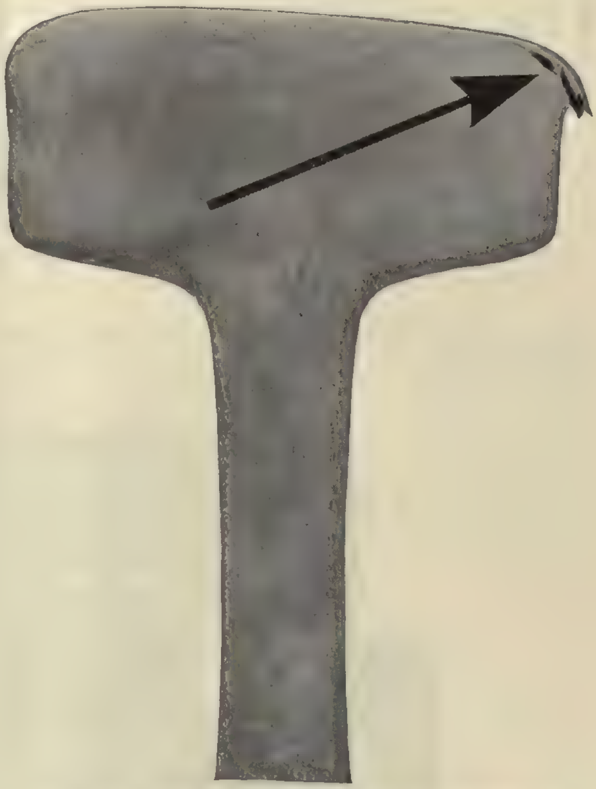
The Lackawanna process, which involves a radical departure from all previous attempts, consists essentially in treating the rail bar while hot and during the rolling, by milling off the respective surfaces sufficiently to secure entire freedom from all surface defects. By this method not only are the seams in the head and base eliminated and the dangers therefrom overcome, but the softer partially decarburized surface is also removed, so that the rolls in subsequent passes do their work on the true, higher carbon steel of the rail bar and not on the softer defective material which heretofore enveloped it at all stages of its production.

The commercial use of Lackawanna Deseaming Process during the past five years has proven so thoroughly successful in producing great and distinct improvement in the finished product that all rails of fifty pounds and over per yard now made by us are subjected to this treatment.

Microscopic, physical and service tests have now demonstrated beyond question that Lackawanna Deseamed Rails are not only entirely free from one of the worst contributory causes to rail failure but have a harder, more uniform running head that adds years of life in hard service.

Rail users will therefore find it to their advantage to give careful attention to the subsequent announcements of this series. In the meantime send for and read our book, "The Lackawanna Deseaming Process", which explains its principle and achievements in detail.

ALL LACKAWANNA RAILS ARE DESEAMED



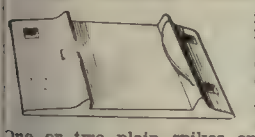
**Rail head sloughed off in service under the cold-rolling action of the wheels—a fault that is due largely to soft surface metal in the rail.**

# Other Lackawanna Aids to Better Track

## The Lackawanna Safety-Head Angle Bar

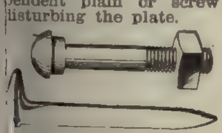
overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle bar for a short space at the center where the rail ends meet.

## The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.



## Lackawanna Track Bolts and Spikes

Our track bolts and spikes of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

## The Abott Rail-Joint Plate

The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars, and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service for use in paved streets and for welding to the rail base and may be held with either screw or ordinary spikes.

**Write for our booklet**
**"Improved Track Appliances"**

# Lackawanna Steel Company

**ngots, Billets, Blooms, Slabs, Mill Plates, Sheet Bars, Merchant Bars, Reinforced Bars, Lackawanna Steel Sheet Piling**

**General Sales Office and Works: Lackawanna, N. Y.**

**New York Buffalo Cleveland Chicago St. Louis San Francisco Boston Philadelphia Cincinnati Detroit Atlanta**

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

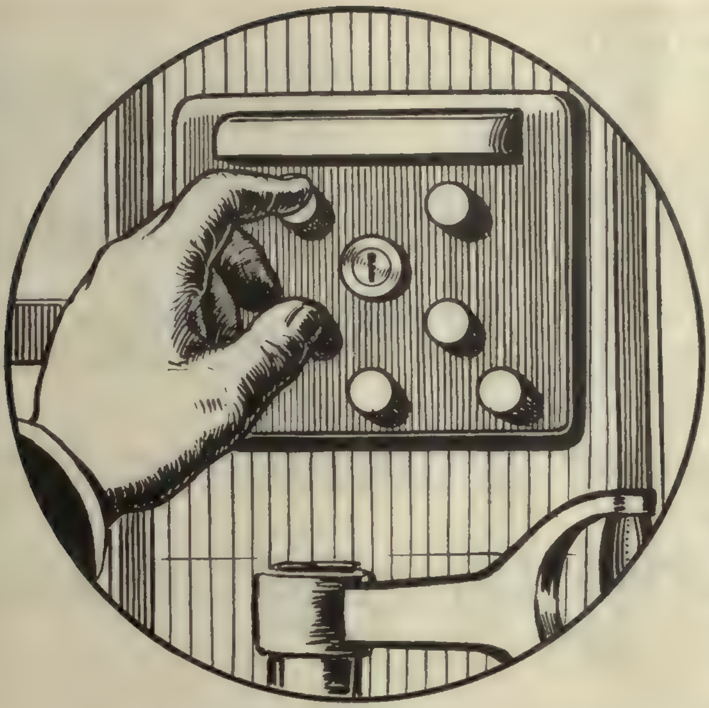
Track Reclamation + Shop Welding with an

# Indianapolis Electric Welder

## Equals Cost of Welder in 60 Days

In use by 95% of the important Street Railways in the United States

**INDIANAPOLIS SWITCH & FROG COMPANY**
SPRINGFIELD, OHIO



# It's Easier—
# It's Safer—
# It's Quicker
# just to "press
# the Button"—

# National Pneumatic Door and Step Control

## can reduce

the operation of the doors and steps of your cars to the simple pressing of a button.

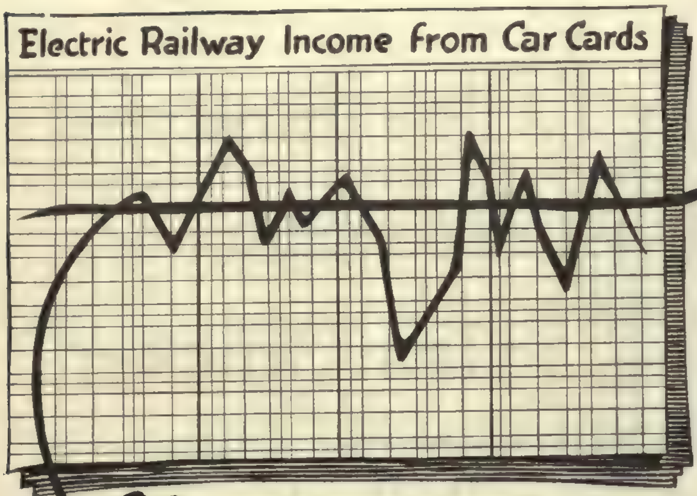
Anybody can press a button—so whether you have able-bodied men, partly disabled soldiers, or conductorettes on your cars, they will find the operation of the doors and steps easier, safer and quicker with **National Pneumatic Door and Step Control.** Perfect control over the doors and the steps not only prevents accidents but accelerates the handling of the passengers and the collecting of fares.

**National Pneumatic Door and Step Control** may also be actuated mechanically through levers or pedals in accordance with your type of car.

The public will expect better service when you ask higher fares. Give it to them with safe and speedy door and step control — NATIONAL PNEUMATIC.

## NATIONAL PNEUMATIC COMPANY
INC.

**50 Church St., New York**
**Edison Bldg., Chicago**
**Works: Rahway, N. J.**


Electric Railway Income from Car Cards

A Continuing *Stabilized Income* uninfluenced by *Fluctuating* Business Conditions

**Both Get the Same High Standard of Car Card Service**

**Both Have a Stabilized Income**

There is a local Collier office in or near the little community, serving the local customers. There is the COLLIER NATIONAL HEADQUARTERS to take care of the big cities and the *national* advertisers. *Satisfied advertisers,* all of them—advertisers whose continued use of car card advertising space insures the stability of that space as a source of advertising revenue to the electric railways great and small.

Barron G. Collier INCORPORATED
Candler Building
220 West 42nd Street, New York City

*The Annual*

# Roll Call

## *of* WHITE TRUCK FLEETS

ACCORDING to its annual custom, The White Company is now publishing its Roll Call of fleet installations (ten trucks or more) in national magazines and metropolitan newspapers.

Year after year this Roll Call grows. It is something more than a list of well-known concerns owning ten or more White Trucks. It represents a yearly progress in added trucks per owner—the most extensive growth of individual fleets ever published by a truck maker.

The rate of growth of the installations which comprise ten trucks or more is shown in the following summary for each year:

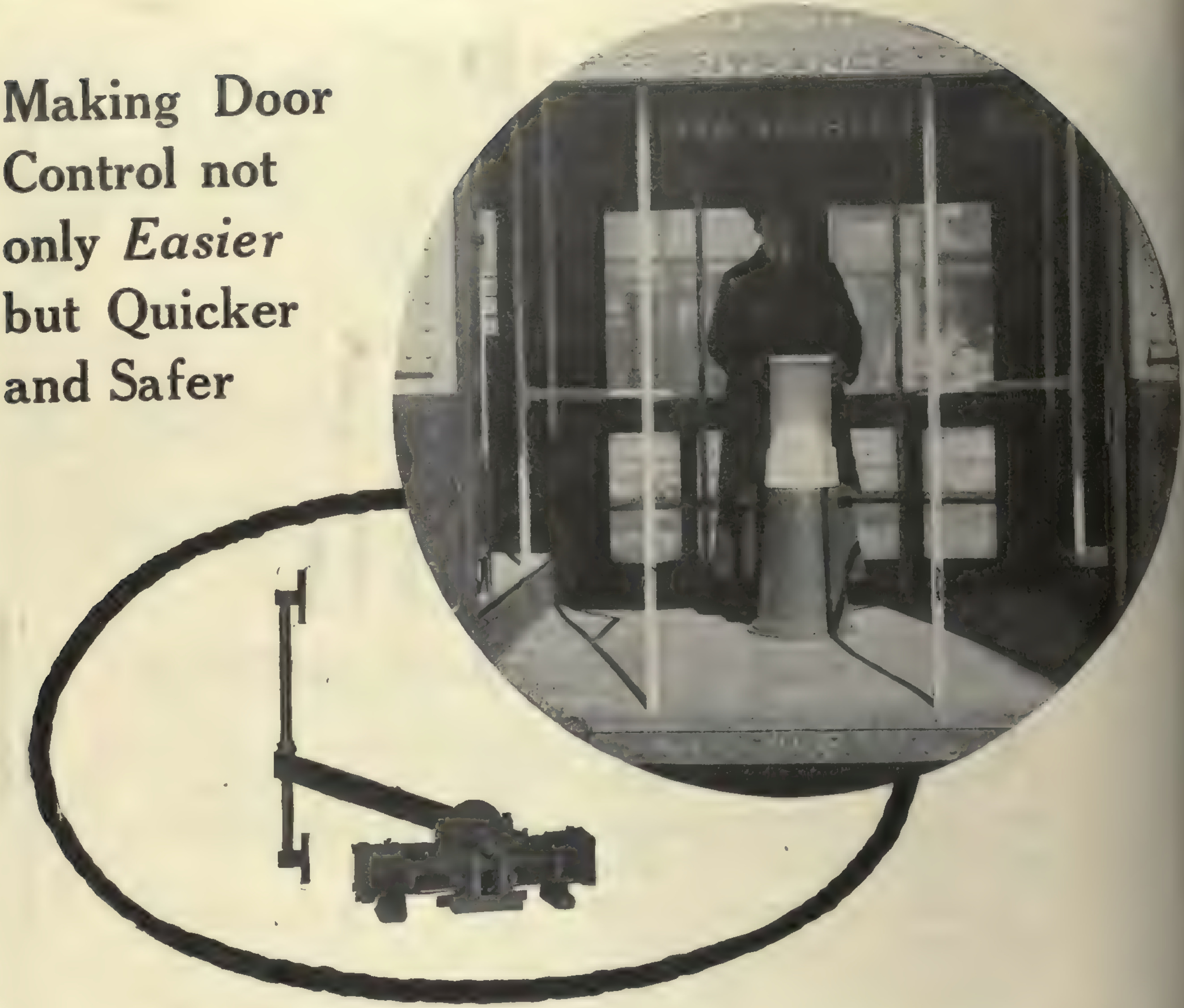
1910...54 1912...495 1914..1704 1916..5147
1911..194 1913..1001 1915..2601 1917 .7436
TODAY. 9227

There are now 2,774 White fleets in active service, totaling 33,139 trucks, exclusive of all single truck installations.

*A copy of the 1919 Roll Call will be sent to anyone interested upon request*

THE WHITE COMPANY
CLEVELAND

Making Door Control not only *Easier* but Quicker and Safer



Consolidated Door Engines

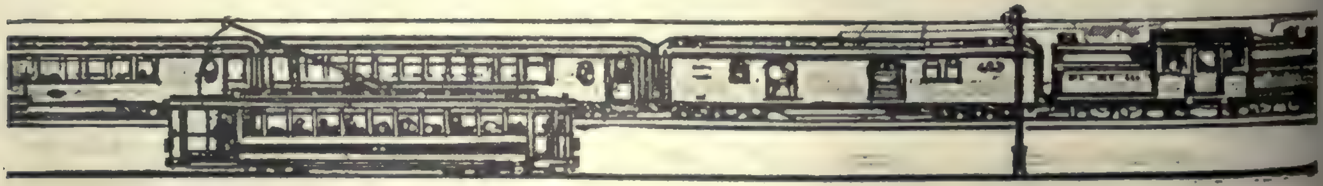
accelerate the handling of passengers, keep the cars running according to schedule, eliminate door accidents and keep the public pleased with the service they are getting.

And after all, what is more important than service when educating the public to the need of increased revenue?

***Your cars can easily be equipped with Consolidated Door Engines. Ask us about it.***

CONSOLIDATED CAR-HEATING COMPANY

ALBANY NEW YORK CHICAGO



# Seattle Installs ECONOMY METERS

The formal transfer of the Puget Sound Traction Light & Power Company's railway lines at Seattle, Wash., to city ownership occurred March 31.

The performance of a number of Economy Power-Saving Railway Meters installed several months ago on Safety Cars operating in Seattle was the determining factor in causing the Superintendent of Public Utilities to place an order for 251 more Economy Meters for delivery at once.

Proof of actual saving of energy plus a reduction of wear and tear on equipment, due to better handling of motors, was the deciding factor in adopting energy-metering as a basis for promoting economy.

*conomy Power-Saving Railway Meters, by recording he kilowatt-hours consumed, show both the motormen nd the management the individual "power bills."' Thus hey get down to the very fundamentals of energy checkng and saving. In addition individual car energy recrds afford data of high engineering value and a conenient basis on which to inspect car equipment.*

***What Economy Meters are doing in Seattle and elsewhere, they will do for you. Write for particulars***

## Economy Electric Devices Company

**General Sales Agent**

**Sangamo Economy Railway Meter**

**Old Colony Bldg., Chicago**

ational Railway Appliance Co., New York
Burton R. Stare Co., Seattle
Ludwig Hommel & Co., Pittsburgh
L. A. Nott, San Francisco
J. G. Monahan, Los Angeles

WEATHER-PROOF LAMP AND SWITCH CONDULETS

VAPOR, GAS *and* DUST-TIGHT

Give maximum protection to both lamp and switch.

Make a safe and permanent lighting equipment for all hazardous locations.

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NEW YORK BOSTON CHICAGO

# DAVIS STEEL WHEELS

## The Danger of Sliding Wheels—

when the brake shoes are set, causing dangerous stresses in the car and track structure as well as expensive "slid flats" is greatly minimized by the use of Davis Steel Wheels. They have the advantage of perfect rotundity, the tread and flange being ground to contour.

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STEEL FOUNDRIES
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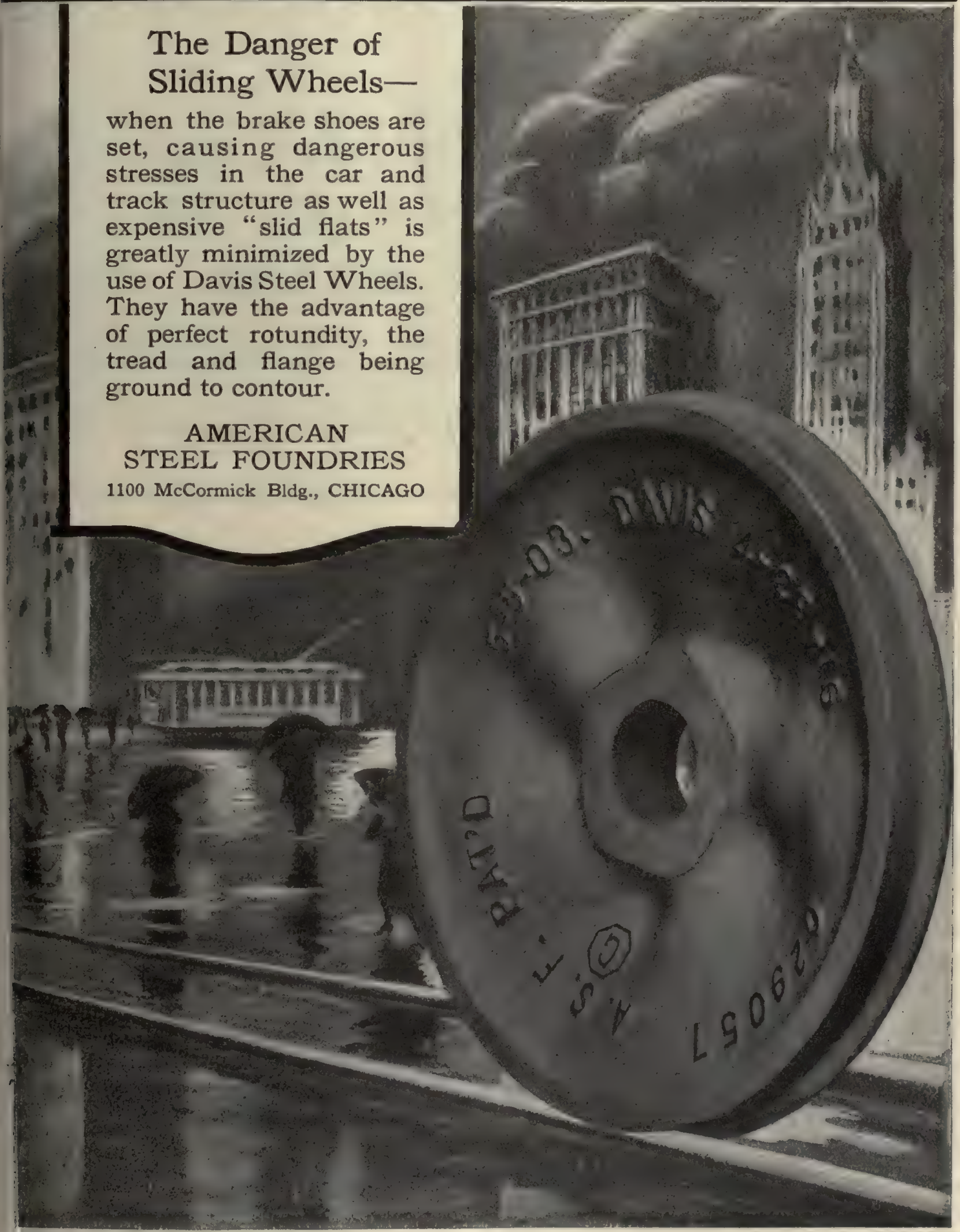


# Compare the Cost!

*Ordinary Trolley Wheel*

***.0014 Cents***

*per set per car mile.*

## MILLER TROLLEY SHOES

***.0005 Cents***

*per set per car mile.*

About 50 per cent. of the Berkshire Street Railway cars are equipped with Miller Trolley Shoes. The cars are 28-ton interurban.

The company has been using Miller Shoes since July, 1917. They purchased 200 sets. A recent test of two Miller Shoes gave 7000 miles each—while the ordinary trolley wheel was ready for scrap at the end of 2500 miles. The Miller Shoes only cost .0005 cents per set per car mile—the wheels .0014 cents per car mile. 200 sets of Miller Shoes give 1,800,000 more miles than 200 sets of wheels.

You can equip *your* cars with Miller Trolley Shoes without changing present poles or bases. Today hundreds of cars on scores of railways of every character of service are equipped with them—and in every case the user reports a life far in excess of the trolley wheel and a wire wear that is much less than it would be with a higher tension contact that does not *hug the wire as tenaciously as the Miller Trolley Shoe.*

Give the Miller Shoe a chance to prove itself on *your hardest line.*

**MILLER TROLLEY SHOE CO.**
**West Newton, Mass.**

# In Spite of Its Looks—

his picture of one of the principal streets in a eading Western American city is not so "ancient" as it might be thought.

This view of Washington Street, Indianapolis, was made in 1872. That is only 47 years ago and there is many an active resident of ndianapolis in whose memory this scene with its ox-drawn springless wagons is fresh and vivid.

It is the greater part of the marvel of growth n transport methods in America—that improvement has been so extremely rapid.

That the stage coach should have yielded to the horse car on rails—the horse car to the cable—the cable to the trolley—is not at all strange. But that all of these successive steps should have been brought about in less than half a century is a monument to the men who have made such achievements possible in so short a period of time.

This quick moving progress could not have been possible except as every department of the industry kept pace with it. In that respect certainly

## Galena Oils
## and
## Galena Service

have carried their full share of the load. Generally speaking, we think it is fair to assume that they have been not laggards but leaders. Which accounts, of course, for their preeminence of use in the field of transportation lubrications.

**Galena-Signal Oil Co.**

Franklin, Pa.

# A Barrier of Safety— Between Him and the Wheels

It is obvious what will happen if your cars are not equipped with

# H-B LIFE GUARDS

But this is what does happen when these Life Guards protect the Careless. The Guard strikes the body and AUTOMATICALLY drops instantly, picking it up and carrying it unhurt until the car stops. A LIFE is saved and MONEY saved for the company. Not only that—but

The public is convinced that the railway is earning increased fares thru better service and protection to life and limb if your cars are equipped with the

*"Barriers of Safety between the fallen pedestrian and the car wheels"*

**The Consolidated Car Fender Co.**
Providence, R. I.

General Sales Agent
**Wendell & MacDuffie Co.**
61 Broadway, New York

*Announcing Another Rico Product*

**A Part of the
RICO
Coasting
Recorder**

**The Benefit of a
Power
Checking Device
with a
Small Outlay**

THE RICO
POWER TIME INDICATOR

The Rico Power Time Indicator shows on a clock dial the minutes the motorman operates his car with power on — thus assisting him to save power by proper operation.

The Rico Power Time Indicator is but a part of the mechanism of the famous Coasting Recorder — which needs no introduction to the Electric Railway Fraternity — and therefore its reliability, based on years of experience, is assured.

You can **RENT** the
Rico Power Time Indicator — or buy it outright.

The Rico Power Time Indicator can be added to — as savings are effected — until you obtain the complete Rico Coasting Recorder.

For instance:
The printing mechanism can be added — or the coasting feature, both parts of the standard Rico Coasting Recorder.

***Let us write you more in detail***

**Time is the Essence of Railroading**

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

## A penny a year for hanger maintenance

Just these two porcelain insulators are all you need to transform an old hanger into a brand new one good for years of service if you use the

## G-E Form P2 Suspension

in your overhead construction.

And the best feature of all is that you have these insulators already in your stock room—they are used for car rheostats.

Porcelain, in the overhead, will last indefinitely. However, to establish a basis for figures, we will assume that, allowing for possible breakage, fifteen years will be the average life. This would make each hanger cost a cent a year — truly a wonderful economy. It will pay you to investigate the Form P2.

G-E LINE MATERIAL
**Can be Shipped Promptly from Stock**

**General Electric Company**

**General Office Schenectady, N.Y.**

40-69

# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

*Volume 53* New York, Saturday, June 7, 1919 *Number 23*

### Constructive Maintenance Raises the Standard of Equipment

ONE of the perplexing problems which progressive superintendents of equipment and master mechanics have to solve is to decide when the additional cost paid for "extra good" material is justified by the results obtained. All realize that the better the material the less will be the trouble experienced in maintaining the equipment, and all are anxious to avoid all the trouble possible. Unfortunately, the cost of a material is not a safe standard by which to judge performance in service. Purchasing agents often cannot understand why the material that is the lowest in price is not the cheapest to buy. Hence the men responsible for the safe operation of the equipment should have at hand plenty of data to prove that it is excessively costly to use poor material.

Aside from the consideration of the cost and trouble resulting from the use of poor-quality supplies, there is another which may be termed "constructive maintenance." By this is meant the renewing of worn-out parts with others which are better than those replaced. By employing such a plan the standard of the equipment is continually raised so that instead of being restored to their original condition, such essentials as motors, controllers and compressors are constantly being put into better condition than ever before. Under high-class maintenance the usefulness, efficiency and life of equipment are always on the increase. With electric railway equipment, where safety in operation is of the highest importance and the first consideration, the best is none too good.

### City Track Not an Energy Saver

THAT the originator of the cheap automobile, himself, should have recognized the value of rails for passenger transportation is quite an event. Indeed, the fact should go far to straighten out the confused minds of the still-numerous city officials who are suffering from the effects of the motor-bus virus.

One does not have to go far to find a reason for preferring rails to rubber tires in view of the latter's extremely high cost when used on heavy vehicles. However, it is the cost of tires rather than the economy of steel rails that enforces the use of track. For example, the very general belief that the track effects large energy savings is really erroneous. Indeed, the energy consumption of a reasonably large car in city service will not be greatly different whether the vehicle be on rails or on asphalt streets; rubber tires, of course, being necessary in the latter case. This rather surprising condition is at once explained when one considers that, in city service, all except a small percentage of the energy consumed by the car is expended in acceleration after stops, rolling resistance being only an incidental item. For example, an energy consumption of 150 watt-hours per ton-mile is quite common in city service where frequent stops are demanded. But if the stops are cut out in part, as in interurban service, the energy consumption falls to the vicinity of 75 watt-hours per ton-mile in spite of the greatly increased wind resistance due to the higher speed. If the stops should be cut out altogether, the demand for energy becomes merely that required to overcome wind and rolling resistance at, say, 20 m.p.h. and the friction losses, which amount all told to something like 40 watt-hours per ton-mile for light cars, or in other words make up a total resistance of 20 lb. per ton.

On rails the pure rolling resistance is almost negligible, being probably less than 1 lb. per ton, and this is practically the only component of energy consumption that would be affected if a railway car should be equipped with rubber tires and run upon the street pavement instead of smooth steel. In this case the total energy consumption would rise by the amount of the increased rolling resistance of rubber tires on pavement, and as the total resistance of rubber-tired vehicles on asphalt pavement has been found to about 35 lb. per ton at 20 m.p.h. (equivalent to about 70 watt-hours per ton-mile) it could be said that the difference between this figure and the energy consumption of 40 watt-hours for a free-running railway car would measure the loss due to the use of tires or the saving to be effected by the use of rails. This difference amounts to 30 watt-hours per ton mile. The result is influenced by the fact that the total resistance of automobiles includes a relatively large component of wind resistance because of the relatively light weight and wind-catching form, and there is also a component of opposite value due to the practice of rigidly mounting railway wheels upon their axles, thus involving slippage at curves. However, since the two components are of opposite value they may be considered as offsetting each other, at least sufficiently for present purposes, and therefore they may be canceled out.

Consequently, removal of a railway car from its rails and running it on the street may be considered as resulting in an increase of 30 watt-hours per ton-mile in energy consumption. If the car should have been in a city service demanding 150 watt-hours per ton-mile the energy input under the new conditions would become 180 watt-hours. Then if the car should be put back on rails the saving in energy due to the use of rails would be 16 per cent. Expressed in terms of cost, the saving of 30 watt-hours per ton-mile would be worth about 0.05 cent per ton-mile; or, for a 7-ton car, would be worth 0.35 cent per car-mile. Such a saving, although well worth consideration in these ultra-economical days, becomes insignificant when compared to the interest charges on modern track, and in consequence one must look to the prohibitive cost of the alternative device—the rubber tire—rather than to the inherent economy of a permanent way of steel to warrant the latter's continued existence.

## Win Walkers, Save Sole Leather and Make Money

THE statement recently attributed to the president of the Dallas Railway, that if it comes to a point where fares must be raised to avoid bankruptcy he is through with that company, must make strange reading for those who profess to believe that railway men are looking only to abnormal profits when they seek to have the rates of fare advanced. However, if one is to judge by the results on numerous properties which have experimented with higher fares, one is likely to conclude that this is not the best way out of the difficulties which surround the railway industry. A striking illustration of this fact is given in the report of the Boston Elevated for last February when the receipts per revenue passenger were 8.15 cents and the cost per passenger 9.30 cents—this, of course, including a reasonable return on the investment which nowadays is regarded as part of the cost of service.

In this connection it is worth while to consider one of the points made by Harlow C. Clark in an address before the New England Street Railway Club in which he stated that unless the electric railways make people want to ride they will not secure or retain that class of riders who do not have to ride. It is becoming increasingly evident that the ideal fare problem solution has not yet been worked out. It certainly does not appear to consist in advancing fares again and again until a great proportion of the profitable short-haul riders are driven away. The number is growing who think it is more likely to be found in some form of zone fare collections.

While the best form of zone system is being determined, there is every reason why the railways should give serious attention to building up their business by encouraging increase of the riding habit under existing rates of fare. Some roads already have found a happier turn of affairs since the return of war workers and a resumption of certain lines of industry.

The only roads which cannot profit by such increased business are those unfortunate institutions which are said to find additional expense in every extra passenger hauled. Disregarding this class of companies, there should be hope in the present tendency toward heavier travel, and the wise manager is he who knows how to get the best results out of the situation.

As President T. E. Mitten of the Philadelphia Rapid Transit Company said in a letter to the employees of that company on May 28, 1919: "Improve our salesmanship so as to sell more of that which we have for sale—street car rides. We must sell the empty seats in the off-peak hours to those who now walk or use other transportation. Every person in the territory we serve is a possible car rider. As the common carrier for the entire community, we fall short of doing our full duty to the public if we do not make a car rider of every walker, every automobile user and every steam railroad passenger who can be more conveniently and cheaply carried by street car."

Here, as in every instance where public favor is sought, the best means of reaching that end must be studied. The railway operator must learn to distinguish between car service and service in the broadest sense. It is not a question of how many cars are on the street but of operating them when and where they are most needed. The conductors and motormen who run them must be taught how to make friends for the company. Now that summer is at hand there is a greater opportunity for attracting additional business outside the rush hours. Many companies are said to be economizing on advertising of attractions along their lines. They might well consider the possibilities of attracting riders who are likely to be in a mood for relaxation now that the strenuous days of war making are over. Once having secured these patrons every effort should be bent to make of them friends who will come to the front in times of adversity. This is the field for the modern transportation salesman.

## "Poland Isn't Lost Yet"

WITH this slogan the Poles comforted themselves through many years of oppression until the day of glory did arrive. To-day it is the electric railway industry which is passing through so dark a period that those who claim to see even a glimmer of hope ahead must produce sound evidence for their slogan: "The electric railway isn't lost yet." The man who is asked to furnish new money cannot be convinced by arguments on the usefulness of electric railways as a class but only by facts and deductions on individual situations. Such individual analyses will prove that it will pay to put new money into a large proportion of our electric railways.

The largest group, namely, small and medium-size properties, can probably invest most profitably by introducing the one-man safety car. When bankers can be shown what a high return this car pays in both money and good-will, they will not be so chary about furnishing the money. Through this type of operation many railways could get their investment in cars back in two or three years: Let us quote the condition on a property recently visited.

This railway is in a small city of the Central States. It used to have the field to itself. After a jitney fever, competition assumed the more menacing form of small motor buses which now carry three times as many passengers as the railway! Because of turnout spacings, the railway cannot give better than a fifteen-minute headway whereas buses are run every two or three minutes. There is no hard feeling against the street railway company. The public simply take the first vehicle that offers, except those people who go to the end of the line, for the buses stop where the paving stops. Because of these very riders, the street railway had to raise its fare from 5 cents to 7 cents while the short-haul buses still continue at 5 cents. This raise in fare caused the loss of more patronage, the 40 per cent increase producing only 12 to 15 per cent more revenue. To summarize: Insufficient track facilities and absence of one-man frequent-service cars are causing the railway to lose at least $300 a day in receipts. Obviously it would not take very long to return the outlay on an opportunity of this kind and bankers ought to be willing to finance it after a personal investigation of the exceptional conditions.

Brooklyn's decision to use 200 safety cars indicates that this car also is suitable to the lighter lines of large city systems, but such properties should find still further opportunities in creating an entirely new class of traffic through short-ride fares. When 25 per cent of the traffic in a city like Aberdeen comes from people who ride less than 0.6 mile it must be clear that there is merit in frequent service and a graded fare which does not penalize the short-haul rider for the long-distance passenger. And why not follow also the example of British municipal roads in eliminating needless track? Surely there are cities where one route with a five-minute service will serve the public better than two routes with ten-minute headways. Also, the more agitation for the removal of duplicate track, the more will the public appreciate the fact that street railways are not uniformly profitable.

Even the interurban, which has suffered so much from the automobile and the motor truck, can face the future with confidence. On the technical side it has much to hope from the automatic substation and from lighter cars; on the operating side, it has barely touched the possibilities of freight development as brought out so thoroughly in A. B. Cole's recent analyses.

There yet remain two groups for which, frankly speaking, there is no hope as commercial propositions. These are the tiny-town and suburban railways, usually the result of land promotion schemes, which should never have been built because of the paucity of customers. The former class ought to face the music and go out of business; the latter must ultimately meet the same fate unless their usefulness to the communities served justifies their being taken over as a community service. There is no more logic in a private operator running an electric railway at a continuous loss than in running a grocery under like circumstances. Although both are essential industries that fact does not bar them from failing through lack of customers.

## Crossing Flagmen Cost Less Than Needless Conductors

ONE OF the few valid objections offered to the use of the modern, one-man car is that involved in the flagging of steam railroad crossings. For some rarely-used spur or unimportant crossing, it is sufficient for the operator (of one-man cars) to give a lookout, if there is nothing to obscure his view. At busy crossings where there is no flagman, it is customary with a two-man car for the conductor to look up and down the track before ordering his car across. In one city where there are many grade crossings the management was very timid about adopting one-man cars for this reason. The usual rule about the conductor signaling across the crossing had always been very rigidly enforced and the management thought no other plan was possible. But when the number of flagmen required to protect every live crossing was checked against the number of really needless conductors, it was found that the latter exceeded by six times the number of conductors who had formerly been required. Nor will this advantage be confined to this saving in man-power, which can be applied to a more profitable purpose in giving additional service. It is obvious that when the crossings are flagged, the one-man cars can run over them without the loss of a second instead of causing the annoyance and delay, in fair weather or foul, which is inevitable when a car must be flagged across by a dismounted conductor.

## The Electric Railway Power Situation as Disclosed by Census Data

THE 1907-1912 statistics furnished by the United States Bureau of the Census and published in the issues of this paper for April 26 and May 3 furnish a basis for study of the power end of the electric railway business. Briefly stated, they show that in 1917 the electric railways of the country used the enormous total of more than 12,000,000,000 kw.-hr. of energy, 35 and 154 per cent more than the consumptions in 1912 and 1907 respectively. During the semi-decade ending with 1917 the kilowatt capacity of railway power houses increased 17 per cent and the output 21 per cent. In one section the corresponding figures were about 47 per cent and more than 100 per cent, while of course some sections were much below the average.

The data show then that there is a fair growth in the power business of the electric railways in spite of the manifest tendency on their part in some sections to purchase power. The facts in this connection, as disclosed by the report, are these: In 1912 almost exactly two-thirds of the power used by the railways was generated by them and one-third was purchased. The corresponding fractions for 1917 were six-tenths and four-tenths. This is not surprising because in a number of places it is found to be cheaper to buy electrical energy than make it, and in almost all cases it has been difficult to procure capital with which to make extensions, such capital as was available being more urgently needed elsewhere than in the power plant.

The statistics cited above lend interest to some editorial comment in a recent issue of an engineering contemporary. The writer says, in substance, that transportation and not power production is the real job of the electric railway man. And further, apropos of some contemplated extensions on a large electric railway system, he says that it is not good business to make large expenditures for that which is in the nature of a side line when the main enterprise requires all of the capital that can be commanded. While in general the logic of this is sound, several points must not be overlooked. First, there is a railway plant capacity of about 3,000,000 kw. extant. At $100 per kilowatt the corresponding investment is $300,000,000 which must be retired gradually if at all. Then there are many interurban and city lines that are not near efficient and reliable central stations and cannot get a satisfactory energy supply from an outside source even if they desire it. Again there are many highly economical railway plants which are large enough to be operated independently and which are being kept up to date in equipment and operating procedure.

As has been pointed out in these columns before, power generation economy in a modern power plant depends largely on the load factor. Many railway companies have good plants and if they can fill in the depressions of the load line by means of industrial load they are in a good position to compete in economy and in the sale of power with the central stations. Many interurban companies, particularly, have been able to develop a lucrative power business at places along their lines, and there is no reason why this business should not increase. It is important, however, that the railway men who are responsible for the power supply make every effort to keep informed as to developments in this field, for rapid progress is being made in steam and electrical machinery design and manufacture.

# Relieving Congestion in Baltimore's Delivery District

### Comprehensive Plan Now Being Carried Out Is Noticeably Improving Traffic Conditions, Particularly in the Half-Mile-Square Dense Business Region

By L. H. PALMER
Assistant to the President United Railways and Electric Company

FOR a number of years the congestion of traffic in the business center of Baltimore had been increasing. This condition developed much more rapidly in recent years with the more widespread use of automobiles. Finally the point was reached where practically all the cars possible were being operated on Baltimore and Fayette Streets, the main two east and west business thoroughfares of the city.

Several causes aggravated the difficulty: (1) the considerable grades which are a feature of the topography of the city; (2) the irregularity of the harbor front; (3) the complicated layout of the streets; (4) the narrowness of the thoroughfares; (5) the lack of efficient and modern regulation and control of the traffic situation; (6) the restricted area of the business district, which is about ½ mile square, and (7) the location of a great proportion of the wholesale business in addition to retail, professional, banking and other general business and commercial work, all in this small congested section. Much of the manufacturing is also done either within or on the outskirts of this restricted district. Baltimore has many large establishments for manufacturing clothing, straw hats and similar business which can be carried on in loft buildings, and these industries employ large numbers of persons in proportion to the amount of ground area occupied, compared with other manufacturing, such as rolling mills or similar industries. Much of Baltimore's freight is water-borne and factories have located near the wharves which bound one side of the congested district.

The officers of the United Railways & Electric Company which operates all of the city electric railway service in Baltimore, determined to obtain competent advice upon this serious problem of congestion, in the effort to arrive at a solution which would permit the operation of additional service into and through the congested downtown district and permit also of more efficient handling of their service for the public use. The congestion and the resulting delays had seriously affected not only the rapid movement of passengers, but also the regularity with which they could obtain service, both of these results affecting the main problem of furnishing more service.

In the early part of 1917, A. L. Drum & Company, construction and consulting engineers, who had successfully solved similar problems in other cities, were engaged for this investigation. Exhaustive studies were begun in the spring of 1917 under the personal direction of Mr. Drum, with E. M. Maddox, resident engineer, in charge. The facilities and resources of the company, including the advice and assistance of its operating staff, were placed at Mr. Drum's disposal, and the work was completed in the fall of 1917, when a report was submitted recommending the rerouting of twelve lines. The recommendations were adopted by the railway company.

With one exception, this rerouting was all confined to the congested business district. One new through route from northeast to southwest Baltimore was inaugurated, and as a result one new operating base was established for this new Federal Street-Columbia Avenue line. Later, due to local conditions which developed opposition, the routes of two of the lines were left unchanged, but the general scope and effect of the plan was not destroyed by this revision, although better results would have followed had the original recommendation been carried out.

In summary, the rerouting was predicated upon three

TABLE I—RUSH-HOUR SERVICE IN CARS PER HOUR AT POINTS OF MAXIMUM CONGESTION ON EACH STREET, AND INCREASE OR DECREASE IN CARS PER HOUR UNDER THE REROUTING PLAN

| East and West Streets | Former | | Present | | Increase or Decrease* in C. P. H. Operated | | Per Cent Increase or Decrease* in C. P. H. Operated | |
|---|---|---|---|---|---|---|---|---|
| | East Bound | West Bound | East Bound | West Bound | East Bound | West Bound | East Bound | West Bound |
| Fayette (Charles to Howard)... | 152 | 132 | 123 | 96 | *29* | *36* | *19* | *27* |
| Baltimore (Gay to South)..... | 155 | 138 | 100 | 85 | *55* | *53* | *35* | *38* |
| Redwood† (South to Charles)...... | 83 | 106 | 82 | 76 | *1* | *30* | 0 | *28* |
| Lombard (Howard to South). | 30 | 0 | 70 | 73 | 40 | 73 | 133 | .. |

*Italics indicate decrease.
†Formerly German.

| North and South Streets | Former | | Present | | Increase or Decrease* in C. P. H. Operated | | Per Cent Increase or Decrease* in C. P. H. Operated | |
|---|---|---|---|---|---|---|---|---|
| | North Bound | South Bound | North Bound | South Bound | North Bound | South Bound | North Bound | South Bound |
| Paca (Baltimore to Lombard).. | .. | .. | 86 | 80 | 86 | 80 | .. | .. |
| Eutaw (Baltimore to Redwood†)....... | 19 | 19 | 16 | 16 | *3* | *3* | *15* | [illegible] |
| S. Howard (Baltimore to Redwood†)... | 108 | 121 | 30 | 45 | *78* | *76* | *72* | [illegible] |
| Park Ave. (Franklin to Redwood†)... | 61 | 58 | 70 | 70 | 9 | 12 | 15 | 21 |
| Charles (Fayette to Baltimore). | 48 | 41 | 12 | 12 | *36* | *29* | *75* | [illegible] |
| Calvert (Center to Pleasant).. | 56 | 60 | 56 | 60 | .. | .. | .. | .. |
| South (Redwood† to Lombard).... | 77 | 48 | 28 | 28 | *40* | *20* | *64* | [illegible] |

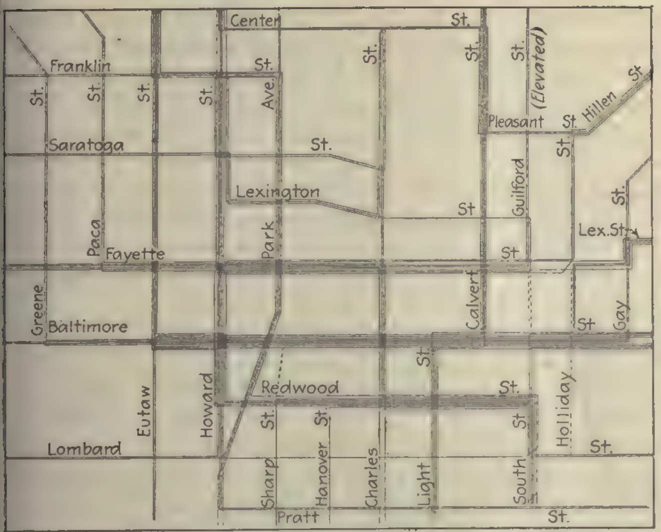


FIG. 1—LINES OF THE UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE, MD., BEFORE REROUTING

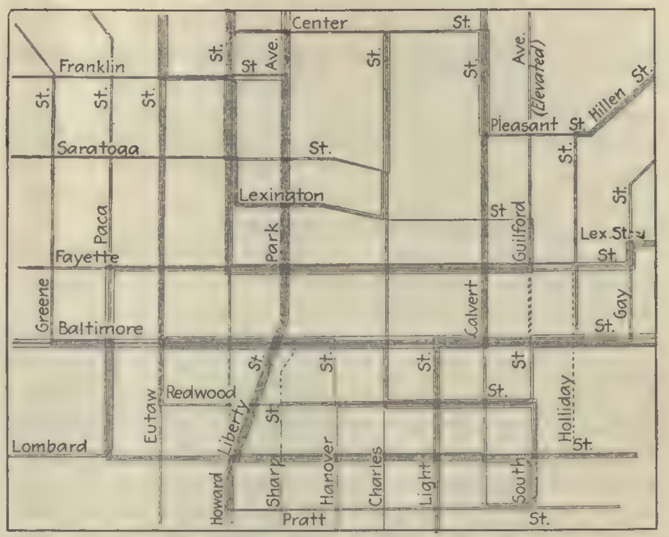


FIG. 2—BALTIMORE LINES AS REARRANGED UNDER THE REROUTING PLAN

principles, namely, (1) balancing and equalizing the amount of traffic on adjacent streets; (2) locating terminals outside of or on the outskirts of the congested district; (3) providing for turning movements at corners outside or on the outskirts of the congested districts.

Consequent upon these changes, additional loop operation was utilized in the business district, to assist in prompt handling of service. This was particularly desirable because the narrow streets do not lend themselves to the use of crossovers for terminals.

### AT SOME POINTS THREE-QUARTERS OF CAR-HOURS WERE TRANSFERRED

Fig 1, showing the routing before the changes, and Tables I and II contain data illustrating the congestion on Baltimore and Fayette Streets compared to the traffic on the two adjoining parallel streets to the south, viz., Redwood (formerly German) and Lombard Streets. It will also be noticed that Howard and Fayette Streets, and Baltimore and Howard Streets were complicated by turning movements which made these two intersections the limiting points on these two thoroughfares. Fig. 2, showing the routing after the changes were effected, together with Tables I and II, indicate how the use of the four parallel and adjacent streets has been balanced.

At the time the rerouting study was made, 638 cars, or 66 per cent of the 960 cars leaving the business district during the maximum evening rush hours, were operated on Fayette and Baltimore Streets. Fifteen lines out of a total of twenty-four leaving this same district were operating practically at their maximum capacity, because of the congestion on these two streets. It was thus evident that service could not be increased without first relieving the existing congestion. As a direct result of the large number of cars on these two streets, the congestion at a number of intersections was such that the service operated through the central area on some of the north and south streets had been limited, and two of the most important intersections, viz., Fayette and Howard Streets, and Baltimore and Howard Streets, had reached their capacity.

ABLE II—STATEMENT SHOWING TOTAL CARS PER HOUR OPERATED ON STREETS IN THE BUSINESS DISTRICT DURING MAXIMUM EVENING RUSH HOUR.

| | Former | | Present | | Increase or Decrease* | | Per Cent Increase or Decrease* | |
|---|---|---|---|---|---|---|---|---|
| ast and West Streets | East Bound | West Bound | East Bound | West Bound | East Bound | West Bound | East Bound | West Bound |
| exington | ... | 89 | ... | 89 | ... | ... | ... | ... |
| aratoga | 40 | ... | 40 | ... | ... | ... | ... | ... |
| ayette | 196 | 175 | 147 | 120 | *49* | *35* | *25* | *29* |
| altimore | 190 | 173 | 149 | 145 | *41* | *28* | *22* | *16* |
| edwood (formerly German) | 83 | 106 | 82 | 76 | *1* | *30* | ... | *28* |
| ombard | 93 | 59 | 70 | 73 | *23* | 14 | *25* | 24 |

| | Former | | Present | | Increase or Decrease* | | Per Cent Increase or Decrease* | |
|---|---|---|---|---|---|---|---|---|
| orth and South Streets | North Bound | South Bound | North Bound | South Bound | North Bound | South Bound | North Bound | South Bound |
| aca | 19 | 20 | 82 | 84 | 63 | 64 | 332 | 320 |
| utaw | 59 | 59 | 59 | 59 | ... | ... | ... | ... |
| oward | 276 | 239 | 207 | 175 | *69* | *64* | *25* | *27* |
| ark Avenue | 61 | 58 | 70 | 70 | 9 | 12 | 15 | 21 |
| harp | ... | 29 | ... | 29 | ... | ... | ... | ... |
| anover | 35 | ... | 35 | ... | ... | ... | ... | ... |
| harles | 88 | 100 | 88 | 100 | ... | ... | ... | ... |
| ight | 40 | 50 | 40 | 50 | ... | ... | ... | ... |
| alvert | 56 | 60 | 86 | 60 | 30 | ... | 54 | ... |
| uilford or South | 172 | 107 | 123 | 87 | *49* | *20* | *28* | *19* |

*Italics indicate decrease.

TABLE III—CARS PER HOUR DURING MAXIMUM EVENING RUSH HOUR AT IMPORTANT INTERSECTIONS IN CONGESTED DISTRICT

| | Cars Per Hour Operated at Intersection | | Decrease in C. P. H. Operated | Per Cent Decrease in C.P.H. Operated |
|---|---|---|---|---|
| | Former | Present | | |
| Fayette Street and Howard Street | 398 | 294 | 104 | 26.1 |
| Fayette Street and Park Avenue | 403 | 359 | 44 | 10.9 |
| Fayette Street and Charles Street | 308 | 243 | 65 | 21.1 |
| Baltimore Street and Howard Street | 438 | 267 | 171 | 39.0 |
| Baltimore Street and Charles Street | 298 | 216 | 82 | 27.5 |
| Baltimore Street and Light Street | 267 | 185 | 82 | 30.8 |
| Baltimore Street and Gay Street | 293 | 185 | 108 | 36.9 |
| Redwood Street (formerly German) and Howard Street | 229 | 145 | 84 | 36.7 |
| Redwood Street (formerly German) and South Street | 189 | 120 | 69 | 36.5 |

TABLE IV—CAPACITY IN CARS PER HOUR OF FORMER MAXIMUM RUSH HOUR WITH ESTIMATED MAXIMUM CAPACITY UNDER REROUTING PLAN

| Sections of the City Served | Former Routing, Former Service | Present Routing, Maximum Service | Per Cent Increase |
|---|---|---|---|
| Northeast | 244 | 356 | 45.9 |
| Northwest | 341 | 462 | 35.5 |
| Southwest | 153 | 258 | 68.6 |
| Southeast | 222 | 327 | 47.3 |
| Total | 960 | 1403 | 46.1 |

To quote from the report: "The proposed system of routing contemplates only such changes as are necessary to relieve the present congestion in order to provide for increasing the service on all existing car lines, and at the same time providing all patrons of the street cars with direct service and reasonably good delivery with the least possible inconvenience due to the necessity for changing existing conditions.

"In order not radically to change existing conditions and to obtain reasonably good delivery, it is necessary that the east and west delivery be maintained on a majority of the lines entering the delivery district. The relief in congestion on the main downtown streets of Baltimore is accomplished principally by a more equal distribution of the cars on the east and west streets utilizing the now unused capacity on Redwood (formerly German) and Lombard Streets and eliminating as far as possible the curving movement of cars so as to reduce the congestion at street intersections in the delivery district.

"Under the proposed system of routing the total track capacity of the delivery district is increased about 46 per cent, as shown in Table IV, on page 1083, and the traffic is so distributed that every line has sufficient available capacity to provide for several years' increase before reaching such congestion as to produce the slow and irregular movement now found on Fayette and Baltimore Streets."

INSTALLING SPECIAL WORK AT BALTIMORE AND CALVERT STREETS

It will be noted that for each of the four sections of the city, as a result of the plan proposed, it was estimated that there was a considerable capacity available for future traffic requirements. This increased capacity was estimated at 443 cars per hour or 46 per cent.

The estimated maximum service is based upon fewer maximum rush-hour cars at controlling points than now operated, so as not to produce the slow-moving and congested conditions now found on Fayette and Baltimore Streets. The number of cars allowed in the estimated figures on Baltimore and Fayette Streets is 140, against 155 cars and 152 cars formerly operated at the most congested sections of these streets. The maximum number of cars allowed on the north and south streets crossing these main east and west streets is 100.

It will be obvious that the increased capacity made available is more or less flexible, so that the future increases can be allotted to the lines requiring them.

As an illustration of the results accruing from the rerouting it should be noted that the relief estimated at the point of maximum congestion, eastbound on Fayette Street, was twenty-nine cars during the maximum rush hours, equivalent to 19 per cent of the car movement, and westbound, thirty-six cars per hour, equivalent to about 27 per cent of the present movement. On Baltimore Street, eastbound, it was estimated at fifty-five cars per hour, during the maximum rush hour, or about 35 per cent of the present movement; and westbound fifty-three cars or about 38 per cent. Similarly at the Fayette and Howard Street intersection it was 104 cars during the maximum rush hour or about 26 per cent, and at the Baltimore and Howard Street intersection, 171 cars or about 39 per cent.

It is well known that cars curving around a corner of an intersection materially decrease its capacity, compared with right-angle movements; hence one of the effective means of improving conditions has been the elimination of curving movements at the congested points. As indicating the results to be obtained, the elimination was provided of 103 curved car movements on Fayette St. with an increase of 143 right-angle crossing movements. Similarly the elimination of curved car movements on Baltimore St. was laid down at 142 and the right-angle crossing movements were to be increased by fifty-eight.

One of the most serious problems in a revision of routing, such as that undertaken in Baltimore, is the inconvenience caused to patrons through moving car lines from one street to another, and unless this inconvenience can be shown to be measurably less than the gain to the other parts of the city and of the system, no good can result from making changes.

At the beginning of the study it was recognized that Fayette and Baltimore Streets were more desirable deliveries than Redwood (formerly German) and Lom-

TABLE V.—EFFECT OF REROUTING ON PASSENGER CONVENIENCE AS TO POINTS OF BOARDING AND LEAVING CARS

| | Total Number of Passengers On and Off Cars Within Delivery District | Number of Passengers On and Off Cars Required to Change Their Place of Boarding and Leaving Cars Under the New System of Routing | Per Cent of Total Passengers Required to Change Place of Boarding and Leaving Cars |
|---|---|---|---|
| Morning rush hours—6 a.m.-9 a.m. | 91,613 | 15,456 | 16.9 |
| Evening rush hours—4 p.m.-7 p.m. | 101,777 | 17,536 | 17.3 |
| Remainder of day | 192,214 | 27,554 | 14.3 |
| Total | 385,604 | 60,546 | 15.8 |
| Estimated number of passengers using cars not counted on day of traffic count | 39,384 | 4,563 | 11.6 |
| Total | 424,988 | 65,109 | 15.3 |

bard Streets, and the plan was prepared so as to affect the fewest possible passengers in order to give the relief essential properly to serve all the street car passengers in the city. Quoting again from the report: "In other words, it is the intent and purpose of this plan to serve the public and to afford the greatest convenience to the greatest number, with the least possible inconvenience to the small percentage of passengers affected by the necessary changes."

That this difficult problem was met is shown by the fact that the maximum number of passengers whose points of boarding and leaving cars were moved one block was less than 9 per cent of the total passengers entering and leaving the business district on an average week day, and fewer than 7 per cent of the total passengers had their present points of boarding and leaving cars moved two blocks. These percentages are maximum figures and include many passengers not inconvenienced by the change, as all transfer passengers are included, though the large majority of them were not affected. There are also a number of passengers on these lines who are delivered nearer their destination by the new routing than under the old plan, but no attempt was made to determine what proportion of the 7 per cent and 9 per cent of passengers were thus benefited.

It should be stated that under the rerouting no portion of any line was moved more than two blocks from its old route.

Table V on page 1084 shows in an interesting way how the percentages were developed.

TRACK CONSTRUCTION IN CONNECTION WITH BALTIMORE REROUTING

It will be obvious to all persons familiar with street railway operation and construction that the installation of the special work and the construction of the new track required by the rerouting was a serious task under war conditions. Under the terms of the ordinance, it was necessary for the company to install special work costing upward of $200,000, and new track costing upward of $60,000, within six months. To accomplish this under the war conditions which existed during the summer and fall of 1918 was a most difficult task, the work comprising about 5900 ft. of single track constructed in accordance with rigid specifications and best modern practice.

Special work had to be installed, revised or renewed at twenty-seven locations. The plan also involved the abandonment, for regular operation, of about 5500 ft. of single track, mostly in outlying sections of the city, due to the new through line.

The actual changing of the routes was divided into three steps, which permitted the rerouting to be accomplished with the mimimum of confusion to the public, and enabled the company to install in sequence the various pieces of new track and special work necessary.

The changes were put into effect during the period from Oct. 1 to Dec. 1 and, generally speaking, there have been few complaints from the public, due to the changes in the old time routes, but on the contrary a noticeable improvement in the operation of cars through the congested district, has resulted. The actual results anticipated have not yet been completely realized, due largely to increased traffic congestion.

### PUBLIC MUST CO-OPERATE BY CONTROLLING VEHICULAR TRAFFIC CONGESTION

This question of traffic congestion and regulation is among the causes aggravating the problem which confronted the United Railways & Electric Company, as mentioned in the second paragraph on page 1082. No efficient control has been established by the municipal authorities over the use of the streets for parking by vehicles; and Drum & Company in their report, by means of observations which they tabulated, indicate very clearly the difficulties imposed upon the operation of the cars though the failure of the city authorities to adopt modern, progressive methods of traffic regulation and control. The company has been urging this subject upon the attention of the authorities for a considerable period.

During the hearing of the company's 6-cent fare case before the Public Service Commission last winter this subject was brought forcibly and emphatically to the attention of the authorities and the public press, by testimony and graphic exhibits, and since that time an ordinance has been passed by the City Council, which will bring considerable relief when put in force. A gratifying feature of the situation was the fact that the automobile interests gave it their hearty support, recognizing that something had to be done for the benefit of the traveling public. One of the principal things accomplished is the limiting of the parking nuisance, and on certain streets its complete elimination during the afternoon rush hours.

## Cars Ready, but No Electricity

A rapid transit electric line running between Osaka and Kobe, Japan, has been extending its lines which will be finished soon. The necessary power for operating this extension was to be supplied by the Osaka Electric Company. The present increased demands for power from this company, however, make it impossible to supply the required amount to operate the transit system. It thus appears that the railroad company must look for power elsewhere, and should it fail in locating a proper supply, the construction of the road must be suspended for the time being.

## Supplement to Report 3808

### San Diego Electric Railway Adds to Figures Presented to Railroad Commission

AN EXTENDED abstract was published in the ELECTRIC RAILWAY JOURNAL for Feb. 8, 1919, of Application 3808, made by the San Diego Electric Railway to the California Railroad Commission asking for authority to increase its fares. The report went very extensively into the history of the property and showed that in spite of most conservative capitalization and efficient management and including a return on the investment, it was costing the company $1.406 for each $1 of business handled. The report was prepared largely by E. J. Burns, of the company's staff.

TABLE I—SOURCE AND DISPOSITION OF THE NICKEL ON THE SAN DIEGO ELECTRIC RAILWAY FROM 1914 TO 1918, INCLUSIVE

| Item | 1914 | 1915 | 1916 | 1917 | 1918 |
|---|---|---|---|---|---|
| Source of Nickel—Income: | | | | | |
| Revenue from transportation | 4.710 | 4.678 | 4.715 | 4.735 | 4.714 |
| Revenue from other railway operations | 0.287 | 0.257 | 0.211 | 0.220 | 0.250 |
| Non-operating income | 0.003 | 0.065 | 0.074 | 0.045 | 0.036 |
| Total income | 5.000 | 5.000 | 5.000 | 5.000 | 5.000 |
| Disposition of Nickel—Outgo: | | | | | |
| Normal maintenance | .390 | .374 | .342 | .377 | .412 |
| Depreciation | 1.090 | 1.330 | 1.476 | 1.558 | 1.404 |
| Power | .435 | .442 | .402 | .639 | .650 |
| Conducting transportation | 1.415 | 1.386 | 1.328 | 1.421 | 1.487 |
| Traffic | .130 | .283 | .098 | .120 | .067 |
| General and miscellaneous | .442 | .542 | .534 | .656 | .690 |
| Total operating expense | 3.902 | 4.357 | 4.180 | 4.771 | 4.710 |
| Taxes assignable to railway operation | .345 | .338 | .366 | .393 | .338 |
| Total outgo | 4.247 | 4.695 | 4.546 | 5.164 | 5.048 |
| Net available for fixed charges | .753 | .305 | .454 | d.164 | d.048 |

*d* Signifies deficit.

A supplementary report has recently been presented to the commission showing, among other things, the estimated operating expenses and revenues for the year 1919 under the present fare, the trend of income and outgo since the organization of the company, etc. These figures are given in great detail. As a summary, the accompanying tables, based on a nickel, were calculated.

A concise definition of each of the items is given in the report. The "investment" is the actual money invested in the property rather than the reproduction cost, this base being taken because the California Commission had indicated its preference for it in its decision in the case of the Town of Antioch vs. Pacific Gas & Electric Company.

TABLE II—SOURCE AND DISPOSITION OF THE NICKEL ON THE SAN DIEGO ELECTRIC RAILWAY— FROM 1892 TO 1918

| Item | Two-Year Period 1892 to 1893 Inclusive | Five-Year Period 1894 to 1898, Inclusive | Five-Year Period 1899 to 1903, Inclusive | Five-Year Period 1904 to 1908, Inclusive | Five-Year Period 1909 to 1913, Inclusive | Five-Year Period 1914 to 1918, Inclusive | Twenty-seven-Year Period 1892 to 1918, Inclusive |
|---|---|---|---|---|---|---|---|
| Source of Nickel—Income: | | | | | | | |
| Revenue from transportation | 4.90 | 4.47 | 4.35 | 4.63 | 4.70 | 4.71 | 4.68 |
| Revenue from other railway operations | .09 | .43 | .60 | .31 | .25 | .25 | .28 |
| Non-operating income | .01 | .10 | .05 | .06 | .05 | .04 | .04 |
| Total income | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Disposition of Nickel—Outgo: | | | | | | | |
| Normal maintenance | .40 | .94 | .87 | .44 | .59 | .40 | .51 |
| Depreciation | 2.12 | 2.83 | 1.47 | .74 | .81 | 1.37 | 1.17 |
| Power | .90 | 1.11 | .70 | .48 | .48 | .49 | .52 |
| Conducting transportation | 2.31 | 1.95 | 1.53 | 1.29 | 1.35 | 1.41 | 1.40 |
| Traffic | .02 | .03 | .08 | .10 | .12 | .14 | .12 |
| General and miscellaneous | .88 | .41 | .45 | .35 | .37 | .58 | .47 |
| Total operating | 6.63 | 7.27 | 5.20 | 3.40 | 3.70 | 4.39 | 4.19 |
| Taxes assignable to railway operation | .09 | .11 | .10 | .10 | .19 | .35 | .25 |
| Total outgo | 6.72 | 7.38 | 5.30 | 3.50 | 3.89 | 4.74 | 4.44 |
| Net available for fixed charges | d1.72 | d2.38 | d .30 | 1.50 | 1.11 | .26 | .56 |
| 8 per cent return on average investment | 2.01 | 2.08 | 1.64 | 1.20 | 1.28 | 1.79 | 1.56 |
| Surplus or deficiency of the nickel | d3.73 | d4.46 | d1.94 | .30 | d .17 | d1.53 | d1.00 |

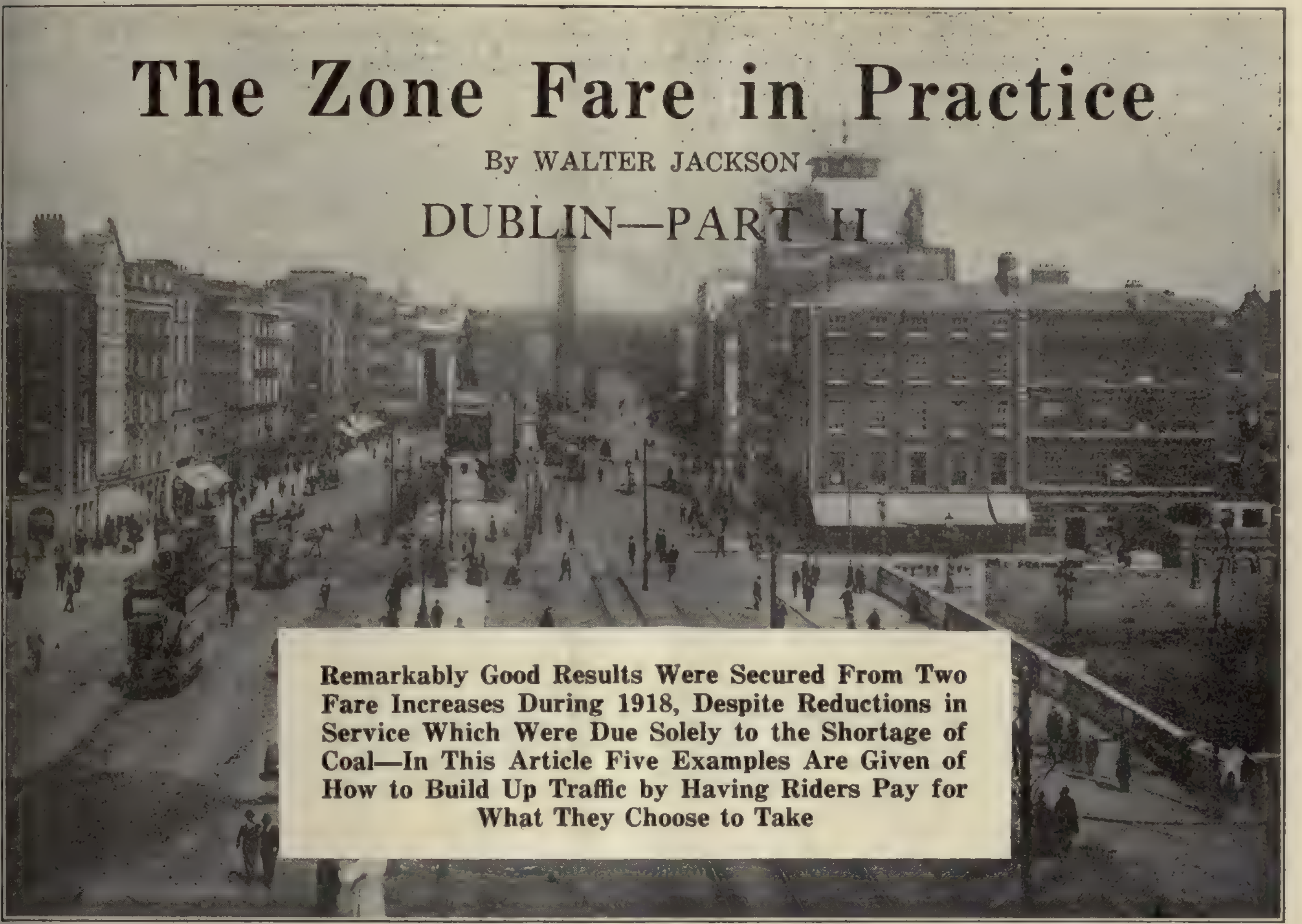
*d* Signifies deficit.

# The Zone Fare in Practice

By WALTER JACKSON

## DUBLIN—PART II

**Remarkably Good Results Were Secured From Two Fare Increases During 1918, Despite Reductions in Service Which Were Due Solely to the Shortage of Coal—In This Article Five Examples Are Given of How to Build Up Traffic by Having Riders Pay for What They Choose to Take**



NELSON'S PILLAR AND SACKVILLE STREET, DUBLIN'S GREAT THOROUGHFARE

UP TO MARCH, 1918, the Dublin United Tramways managed to continue the pre-war services, fares and stages despite the burdens imposed by the war. By that time, however, the need to conserve coal became so urgent that service had to be reduced, as outlined in Part I in the ELECTRIC RAILWAY JOURNAL of May 31, 1919. Similarly the cost of operation had reached the point where more revenue per car-mile was necessary.

As the company was bound by various franchise agreements, it could not change the fares so freely as otherwise. For example, one condition in the Dublin franchise is that the fare within an inner boundary (shown in the map on page 1039 of the issue for May 31) must not exceed 1d. Furthermore, in an agreement made with the municipality in 1897, it was specifically stated that the fare between many of the city termini and the city boundary should not exceed 1d., provided the distance did not exceed 1½ miles, and no fare within the city on any one of the lines should exceed 2d. From Nelson's Pillar as the common terminus, in the sense of this agreement, the company is giving 1½ miles per penny and even a little more where the old boundary happens to be in waste territory.

The first revision of fares, which became effective on April 27, 1918, resulted in raising all but the penny statutory fares to 1½d. The fares on the Dalkey and Howth suburban lines were raised from 5d. to 6d. and the stages were shortened. A few penny fares not required by statute still remained. Following a further advance in wages, the fares were increased a second time on Nov. 4, 1918. Almost all of the overlapping stages were eliminated and other stages were shortened. The fares on the Dalkey 9-mile line and the Howth 9.5-mile line were raised to their present maximum of 7d. and season tickets on these lines were also discontinued during the year. An idea of the increased cost to the suburbanite may be gained from considering that the original one-way fares and round-trip fares on these lines were 5d. and 8d. respectively, which are still the steam rates.

The characteristic features of the first fare revision were the elimination of a few overlaps and the substitution of a 1½d. for a 1d. fare on certain overlaps or on sections which exceeded the statutory length of a penny stage from the center of the city. The adoption of the 1½d. fare did not, of course, affect the majority of the riders, as they could still ride 1½ miles or so to or from the center of the city. Likewise the through 2d. rider remained unaffected. The increased revenue came entirely from former 1d. passengers who had been getting a maximum ride. Many of these actually pay 2d. because they do not think it worth while to walk several hundred yards at the end of the 1½d. stage merely to save a half-penny. This effect was the result of good psychology on the part of the management. If it had not given the passenger the option of saving the half-penny, he would have walked to and from the end of the statutory penny stage wherever possible.

In the second revision of fares a large number of overlaps were eliminated, partly to simplify fare collection. The shorter lines were divided into two zones, the first being approximately the statutory penny stage and the second a 1½d. stage for a slightly longer journey in the outer section and in less settled territory. The terminus-to-terminus fare, however, remained 2d. Thus the 2d. habit acquired voluntarily by the passenger under the first revision made it easier to secure the same rate after most of the old options had been wiped out. Even to-day the passenger feels that he is exercising some choice because if he chooses to pay 2d. at once he will not, when outbound, have to pay another 1½d. if he does not care to walk in the second stage. Then, too, an inbound passenger from the outer zone does not begrudge the payment of a penny more if he gets frequent service.

In discussing the principles that should govern a fare increase, D. Brophy, traffic manager of the company, put much stress on the policy of disturbing as few patrons as possible, of placing a burden where it would fall most justly on the long riders and of making the revisions in a way that left some choice to the riders. There was a limit to raising fares at any given time. Personally, he believed that if the fare to the outer zone were made 3d. instead of 2d., the revenue as well as the riders would be less for this zone.

For the information of the board of directors, G. Marshall Harriss, general manager, prepared a most able analysis of the effects of the two fare increases, with a series of diagrams to show the shortening of the stages on the several routes. The accompanying figures in Table I to Table V, as well as the diagrams reproduced in Fig. 1 to Fig. 5, are taken from Mr. Harriss' analysis.

Table I gives the general results of the changes in fares and service during 1918 up to Nov. 30. It was only during the heavy influenza period of Nov. 4 to Nov. 30 that there was a decrease of passengers compared with the same period of 1917, but even at that there was a substantial increase in revenue. Furthermore, thirty cars less were run every day between Jan. 1 and Nov. 30, 1918, as compared with the same period of 1917.

TABLE I—SUMMARY OF RESULTS OF TWO FARE INCREASES OF DUBLIN UNITED TRAMWAYS TO NOV. 30, 1918

| | Jan. 1-March 20 Full Service at Ordinary Fares | March 21-April 26 Reduced Service at Ordinary Fares | April 27-Nov. 3 First Revision of Fares | Nov. 4-Nov. 30 Second Revision of Fares | Totals |
|---|---|---|---|---|---|
| Receipts: | | | | | |
| 1918..... | £81,946 | £38,315 | £251,516 | £31,361 | £403,139 |
| 1917..... | 66,806 | 32,033 | 197,915 | 26,015 | 322,771 |
| Increase.. | 15,139 | 6,282 | 53,600 | 5,345 | 80,368 |
| Passengers: | | | | | |
| 1918..... | 15,777,725 | 7,230,865 | 37,320,885 | 4,667,208 | 64,996,683 |
| 1917..... | 12,957,682 | 6,137,591 | 36,508,494 | 5,036,469 | 60,640,236 |
| Increase.. | 2,820,043 | 1,093,274 | 812,391 | *369,261 | 4,356,447 |
| Car-miles: | | | | | |
| 1918..... | 1,671,614 | 678,593 | 3,414 263 | 431,955 | 6,196,425 |
| 1917..... | 1,630,196 | 756,374 | 4,080,068 | 560,185 | 7,026,823 |
| Increase.. | 41,418 | *77,781 | *665,805 | *128,230 | *830,398 |
| Car-days: | | | | | |
| 1918..... | 16,523 | 6,653 | 33,134 | 4,202 | 60,512 |
| 1917..... | 16,354 | 7,613 | 41,130 | 5,638 | 70,735 |
| Increase.. | 169 | *960 | *7,996 | *1,436 | *10,223 |
| Receipts per car-mile (pence): | | | | | |
| 1918..... | 11.76 | 13.55 | 17.68 | 17.42 | 15.61 |
| 1917..... | 9.83 | 10.16 | 11.64 | 11.14 | 11.02 |
| Passengers per car-mile: | | | | | |
| 1918..... | 9.43 | 10.65 | 10.93 | 10.80 | 10.49 |
| 1917..... | 7.94 | 8.11 | 8.94 | 8.99 | 8.63 |
| Cars per diem: | | | | | |
| 1918..... | 209.15 | 179.81 | 173.47 | 155.70 | 181.18 |
| 1917..... | 207.02 | 205.75 | 215.34 | 208.81 | 211.78 |

*Decrease.

TABLE II—RESULTS OF FARE AND SERVICE CHANGES ON TERENURE LINE

| | Jan. 1-March 20 | March 21-April 26 | April 27-Nov. 3 | Nov. 4-Nov. 30 |
|---|---|---|---|---|
| Receipts: | | | | |
| 1918..... | £7,716 | £3,665 | £21,257 | £3,113 |
| 1917..... | 6,453 | 2,989 | 16,842 | 2,510 |
| Increase.. | 1,263 | 675 | 4,415 | 603 |
| Passengers: | | | | |
| 1918..... | 1,531,691 | 730,662 | 3,539,286 | 491,869 |
| 1917..... | 1,281,860 | 593,777 | 3,328,092 | 498,665 |
| Increase.. | 249,831 | 136,885 | 211,194 | *6,796 |
| Car-miles: | | | | |
| 1918..... | 145,514 | 59,017 | 273,968 | 38,427 |
| 1917..... | 139,432 | 64,681 | 341,296 | 48,716 |
| Increase.. | 6,082 | *5,664 | *67,328 | *10,289 |
| Car-days: | | | | |
| 1918..... | 1,513 | 642 | 2,846 | 416 |
| 1917..... | 1,521 | 705 | 3,729 | 524 |
| Increase.. | *8 | *63 | *883 | *108 |
| Receipts per car-mile (pence): | | | | |
| 1918..... | 12.72 | 14.90 | 18.62 | 19.44 |
| 1917..... | 11.10 | 11.09 | 11.84 | 12.36 |
| Passengers per car-mile: | | | | |
| 1918..... | 15.26 | 12.38 | 12.91 | 13.28 |
| 1917..... | 9.19 | 9.17 | 9.75 | 10.23 |

*Decrease.

TABLE III—RESULTS OF FARE AND SERVICE CHANGES ON INCHICORE LINE

| | Jan. 1-March 20 | March 21-April 26 | April 27-Nov. 3 | Nov. 4-Nov. 30 |
|---|---|---|---|---|
| Receipts: | | | | |
| 1918..... | £5,381 | £2,354 | £14,156 | £2,046 |
| 1917..... | 4,322 | 1,954 | 11,323 | 1,607 |
| Increase.. | 1,059 | 400 | 2,833 | 439 |
| Passengers: | | | | |
| 1918..... | 1,079,111 | 471,096 | 2,411,323 | 341,249 |
| 1917..... | 872,477 | 396,795 | 2,304,346 | 330,099 |
| Increase.. | 206,634 | 74,301 | 106,977 | 11,150 |
| Car-miles: | | | | |
| 1918..... | 90,824 | 38,537 | 185,832 | 24,935 |
| 1917..... | 85,913 | 40,194 | 207,889 | 29,339 |
| Increase.. | 4,911 | *1,657 | *22,057 | *4,404 |
| Car-days: | | | | |
| 918..... | 910 | 374 | 1,959 | 256 |
| 917..... | 879 | 413 | 2,139 | 303 |
| Increase.. | 31 | *39 | 180 | 47 |
| Receipts per car-mile (pence): | | | | |
| 1918.. .. | 14.24 | 14.66 | 18.28 | 19.70 |
| 1917..... | 12.07 | 11.67 | 13.07 | 13.15 |
| Passengers per car-mile: | | | | |
| 1918..... | 11.88 | 12.22 | 12.97 | 13.68 |
| 1917..... | 10.15 | 9.87 | 11.08 | 11.25 |

*Decrease.

TABLE IV—RESULTS OF FARE AND SERVICE CHANGES ON DONNYBROOK AND CLONSKEAGH LINES

| | Jan. 1-March 20 | March 21-April 26 | April 27-Nov. 3 | Nov. 4-Nov. 30 |
|---|---|---|---|---|
| Receipts: | | | | |
| 1918..... | £11,886 | £4,932 | £29,356 | £4,087 |
| 1917.... . | 9,831 | 4,554 | 25,773 | 3,848 |
| Increase.. | 2,054 | 377 | 3,582 | 239 |
| Passengers: | | | | |
| 1918..... | 2,441,122 | 990,127 | 4,900,244 | 662,171 |
| 1917..... | 2,032,324 | 942,330 | 5,300,428 | 792,901 |
| Increase.. | 1,913 | 28,725 | 140,128 | 22,946 |
| Car-miles: | | | | |
| 1918..... | 236,451 | 79,051 | 417,638 | 57,475 |
| 1917..... | 234,538 | 107,776 | 557,766 | 80,421 |
| Increase.. | 1,913 | *28,725 | *140,128 | *22,946 |
| Car-days: | | | | |
| 1918..... | 2,459 | 807 | 4,134 | 584 |
| 1917..... | 2,472 | 1,142 | 5,880 | 847 |
| Increase.. | *13 | *235 | *1,746 | *263 |
| Receipts per car-mile (pence): | | | | |
| 1918..... | 12.06 | 15.00 | 16.86 | 17.06 |
| 1917..... | 10.06 | 10.14 | 11.09 | 11.48 |
| Passengers per car-mile: | | | | |
| 1918..... | 10.32 | 12.52 | 11.73 | 11.52 |
| 1917..... | 8.66 | 8.74 | 9.50 | 9.85 |

*Decrease.

TABLE V—RESULTS OF FARE AND SERVICE CHANGES ON DALKEY LINE

| | Jan. 1-March 20 | March 21-April 26 | April 27-Nov. 3 | Nov. 4-Nov. 30 |
|---|---|---|---|---|
| Receipts: | | | | |
| 1918..... | £15,692 | £8,008 | £62,046 | £7,287 |
| 1917..... | 12,571 | 6,417 | 42,805 | 5,081 |
| Increase.. | 3,120 | 1,590 | 19,241 | 2,206 |
| Passengers: | | | | |
| 1918..... | 2,188,865 | 1,085,139 | 5,813,569 | 659,403 |
| 1917..... | 1,772,612 | 890,281 | 5,563,009 | 707,283 |
| Increase.. | 416,253 | 194,858 | 250,560 | *47,880 |
| Car-miles: | | | | |
| 1918..... | 283,633 | 132,477 | 646,407 | 82,272 |
| 1917..... | 274,482 | 129,305 | 717,528 | 97,209 |
| Increase.. | 9,151 | 3,172 | *71,121 | *15,077 |
| Car-days: | | | | |
| 1918..... | 2,425 | 1,155 | 5,608 | 701 |
| 1917..... | 2,412 | 1,166 | 6,354 | 835 |
| Increase.. | 13 | *11 | *646 | 134 |
| Receipts per car-mile (pence): | | | | |
| 1918..... | 13.27 | 14.51 | 23.03 | 21 25 |
| 1917..... | 10.99 | 11.91 | 14.31 | 12.54 |
| Passengers per car-mile: | | | | |
| 1918..... | 7.71 | 8.16 | 9.00 | 8.01 |
| 1917..... | 6.45 | 6.88 | 7.75 | 7.27 |

*Decrease.

Through the courtesy of W. McHugh, secretary, the figures in Table I are supplemented by the following, which give the car-mile receipts for the entire calendar year 1918 as compared with 1917:

RECEIPTS PER CAR-MILE (IN PENCE)

| | 1918 | 1917 |
|---|---|---|
| Period in 1918 prior to first revision of fares or from Jan. 1 to April 26 | 12.28 | 9.94 |
| Period in 1918 from date of first revision, April 27 to Nov. 3, 1918 | 17.68 | 11.64 |
| Period after second revision, Nov. 4 to Dec. 31 | 18.25 | 11.44 |
| Receipts per car-mile per annum | 15.86 | 11.63 |

Note—The receipts per car-mile in 1914 were 9.63 d.

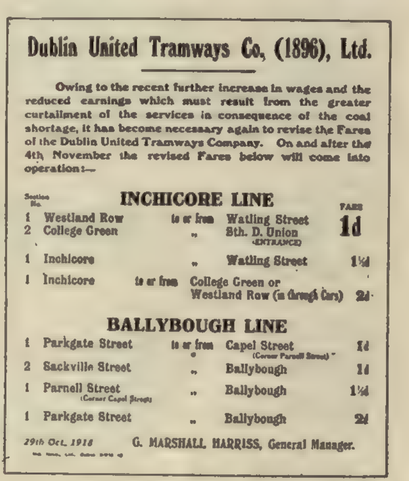
It will be seen from Mr. McHugh's figures that the earnings per car-mile are now nearly twice those of 1914 and compare favorably with American figures.

### HOW CHANGES WORKED OUT ON TYPICAL LINES

Table II to Table V and Fig. 1 to Fig. 5, as prepared by Mr. Harriss, show the outcome of the fare and service changes on typical individual lines. These exhibits should be considered in the light of the general route map, in the issue of May 31, and the following information:

The Terenure line originally had two end-on and two overlapping 1d. stages and one 2d. stage all the way, as shown in the top diagram in Fig. 1. On April 27, 1918, only the statutory 1d. stage remained, the other three 1d. stages having been raised to 1½d., with the 2d. stage as before, as shown in the middle diagram. On Nov. 4, the two overlapping 1½d. stages were abolished, the other stages remaining as before, as shown on the bottom diagram. The results of these changes are indicated in Table II.

The Inchicore line had the pre-war fares up to April 27, 1918, as shown on the top diagram in Fig. 2, there being two stages end-on with three overlapping stages, which had 1d. fares with a 2d. fare all the way. On March 21 came the first reduction in service. On April 27 there was a further reduction in service, and both fares and stages were altered as follows: The running to Westland Road (Nelson's Pillar) was abolished, and all cars were turned at College Green. The 1d. fare from College Green to South Dublin Union remained. The 1d. fare from Inchicore to Watling Street was raised to 1½d. All other 1d. fares were abolished, and the 1d. stage from Nicholas Street to Kilmainham was shortened to Old Kilmainham for 1½d.



**Dublin United Tramways Co, (1896), Ltd.**

Owing to the recent further increase in wages and the reduced earnings which must result from the greater curtailment of the services in consequence of the coal shortage, it has become necessary again to revise the Fares of the Dublin United Tramways Company. On and after the 4th November the revised Fares below will come into operation:—

**INCHICORE LINE**

| Section No. | | | | Fare |
|---|---|---|---|---|
| 1 | Westland Row | to or from | Watling Street | 1d |
| 2 | College Green | „ | Sth. D. Union (ENTRANCE) | 1d |
| 1 | Inchicore | „ | Watling Street | 1½d |
| 1 | Inchicore | to or from | College Green or Westland Row (in through Cars) | 2d |

**BALLYBOUGH LINE**

| Section No. | | | | Fare |
|---|---|---|---|---|
| 1 | Parkgate Street | to or from | Capel Street (Corner Parnell Street) | 1d |
| 2 | Sackville Street | „ | Ballybough | 1d |
| 1 | Parnell Street (Corner Capel Street) | „ | Ballybough | 1½d |
| 1 | Parkgate Street | „ | Ballybough | 2d |

29th Oct. 1918 G. MARSHALL HARRISS, General Manager.

HOW INDIVIDUAL ROUTE PATRONS IN DUBLIN ARE TOLD OF FARE INCREASES

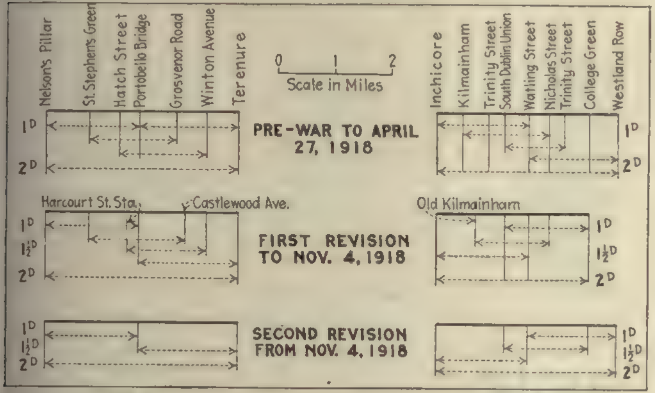


FIG. 1 FIG. 2

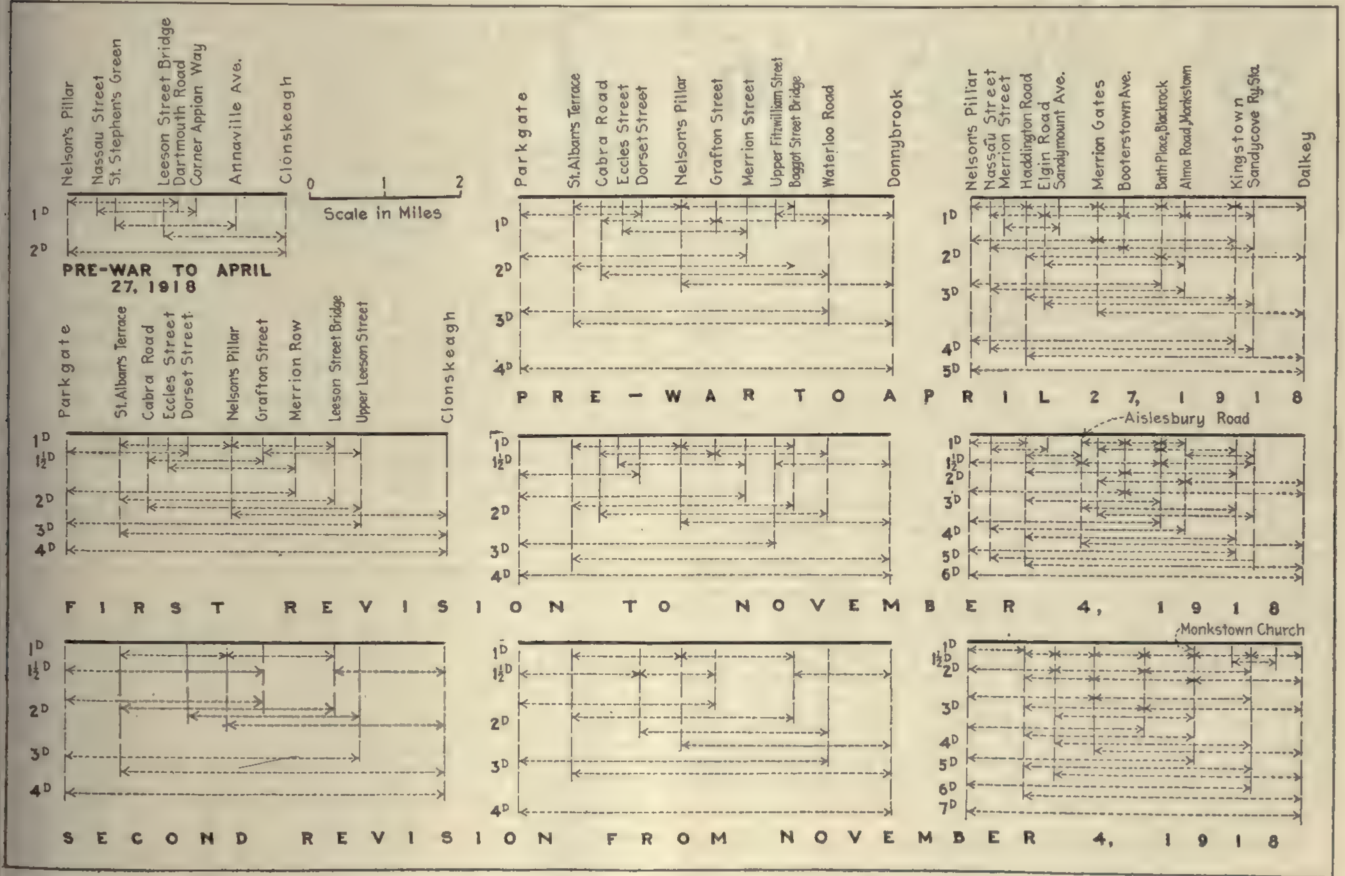


FIG. 3 FIG. 4 FIG. 5

HOW ZONE FARES WERE SHORTENED FOR TWO FARE INCREASES IN DUBLIN

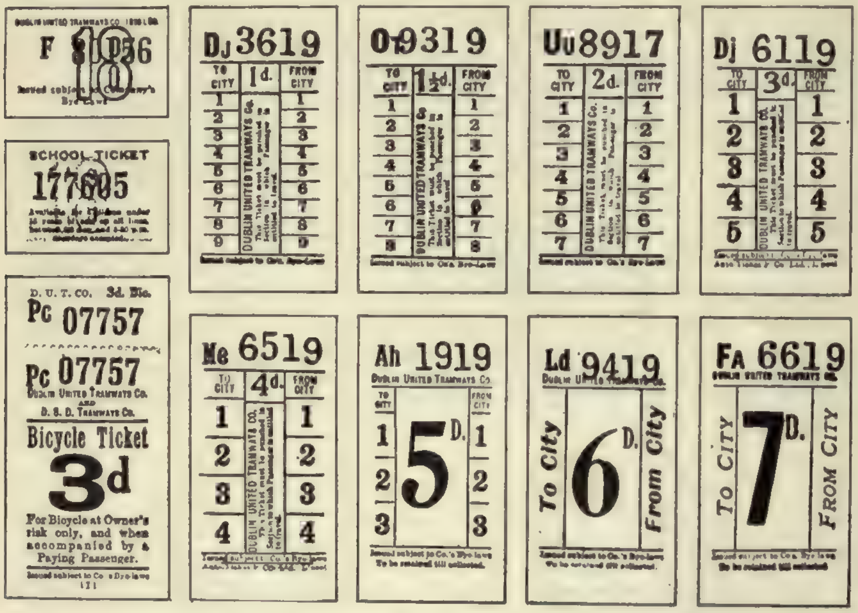
Fig. 1—Terenure Line. Fig. 2—Inchicore Line. Fig. 3—Clonskeagh Line (now Donnybrook-Clonskeagh). Fig. 4—Donnybrook Line. Fig. 5—Dalkey Line

The fare from Inchicore to College Green remained 2d, as shown on the middle diagram.

On Nov. 4 came a second alteration in the stages. The running to Westland Row had been previously restored partially to meet morning and evening trains, and the stages were now altered to suit, as shown on the bottom diagram. The 1d. fare from College Green to South Dublin Union remained as an overlapping stage to the original 1d. stage, Westland Row to Watling Street, which was restored, and the 1½d. stage from Watling Street to Inchicore remained as an end-on stage. The original 2d. fare for the whole distance was also restored, as shown in the bottom diagram. The results are given in Table III.

The combination of the originally independent Clonskeagh service with an arm of the Donnybrook-Phoenix Park through line was carried out in the following manner: Originally the Clonskeagh line ran from Nelson's Pillar via Leeson Street and Appian Way to Clonskeagh, with four 1d. stages and 2d. stage all the way, as shown in the top diagram in Fig. 3. On April 27, 1918, the Phoenix Park-Donnybrook line via Stephen's Green was diverted to Clonskeagh, and the original Clonskeagh line was taken off. Penny and 1½d. stages were then introduced as shown on the middle diagram. On Nov. 4 the 1½d. stages were cut down to three, and one of the 2d. stages was shortened to end at Grafton Street instead of Merrion Street. Other stages remained as shown in the bottom diagram.

On the Donnybrook line (Fig. 4) there were originally seven 1d. stages, as shown in the top diagram. On April 27 only the two statutory 1d. fares in the city remained, for the other 1d. stages were raised to 1½d. as shown in the middle diagram. On Nov. 4 two of the 1½d. stages were abolished. Of the three remaining, two were shortened as shown in the bottom diagram. The results of the Clonskeagh and Donnybrook changes are presented in Table IV.



DUBLIN'S ZONE-NUMBERED TICKETS, SCHOOL AND MESSENGER TICKETS AND BICYCLE TICKETS

On the Dalkey suburban line (Fig. 5) there were originally ten 1d. stages with 3d., 4d. and 5d. stages respectively to Blackrock, Kingstown and Dalkey, as shown in the top diagram. On April 27 the stages were revised all along the line. Four 1d. stages remained with six 1½d. stages, while the stages to Blackrock, Kingstown and Dalkey were raised respectively to 4d., 5d. and 6d., as shown in the middle diagram. On Nov. 4 there was a second general revision. Only the statutory 1d. stages remained with eight 1½d. stages, and the Blackrock, Kingstown and Dalkey stages were again raised to 5d., 6d. and 7d., as shown in the bottom diagram. The results are given in Table V.

The figures given in the foregoing tables surely are sufficient to prove that the traffic of the Dublin United Tramways has not suffered unduly despite increases in fare and decreases in service. The company had no desire to cut service, and with the improvement in the coal situation it will restore pre-war conditions as rapidly as possible. That the increased revenue was needed may be gleaned from a few figures in the report for the fiscal year ended Dec. 31, 1918, and some comparisons prepared by Mr. McHugh:

In 1918 coal cost 36s. 4⅓d. per ton as compared with 27s. 6⅔d. for 1917 and 9s. 7⅓d. in 1906.

In 1918 3.798 lb. coal was required per kilowatt-hour, and in 1917, 3.44 lb.

In 1918 traffic wages were £95,723, and in 1917, with more mileage, £79,942.

In 1918 gross receipts were £463,998, and operating expenses, £321,934; and in 1917 gross receipts were £371,572, and operating expenses, £251,951.

In 1918 power cost 1.686d., maintenance 3.131d., and traffic 3.976d. per car-mile, and in 1917 power cost 1.142d., maintenance 1.782d., and traffic 2.887d. per car-mile.

In 1918 general charges, sundries, franchise charges and fixed charges were 3.972d., and in 1917 3.229d.

Traffic receipts for 1918 were 44.9 per cent greater than in 1914, and passengers carried were 21.8 per cent greater, while the car mileage showed a decrease of 12 per cent. The percentage ratios of expenditures to traffic receipts were:

| | 1918 | 1914 |
|---|---|---|
| Power station operation | 10.6 | 7.1 |
| Maintenance of cars, track, etc. | 19.7 | 13.5 |
| Traffic (wages only) | 21.6 | 21.4 |
| Total traffic expenses | 25.0 | 24.8 |
| General charges | 14.7 | 14.8 |
| Ratio of expenses to receipts from parcels traffic | 82.0 | 55.0 |
| Ratio of expenses to receipts from goods carried | 63.0 | 56.0 |
| Ratio of total operating and general expenses to total receipts | 69.7 | 59.0 |

## CLASSIFICATION OF RIDERS AND CHARACTER OF TICKETS

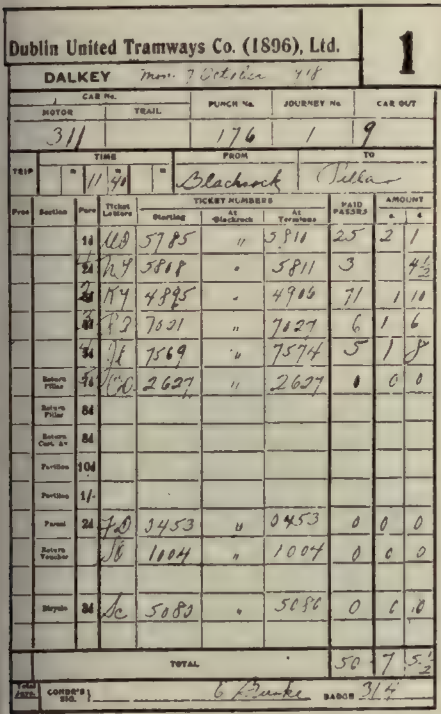
Because of the two revisions in rates of fare during 1918, important differences will be observed in Table VI showing the classification of passengers carried during 1917 and 1918. During this period the average fare per passenger advanced from 1.274d. to 1.498d. It is clear that the average passenger fare in Dublin is not so far below what it has been in the United States when allowance is made for the transfer.

The figures in Table VI require little explanation. It is plain that the losses in penny passengers were more than made up by the creation of 1½d. passengers and the augmentation of 2d. passengers, and that the suburban traffic did not suffer. That this is a remarkable showing for the industrial conditions obtaining at Dublin goes without saying.

Of the various rates of fare referred to in the table,

TABLE VI—CLASSIFICATION OF DUBLIN RIDERS ACCORDING TO FARES

| | 1918 | | 1917 | |
|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent |
| 1d. | 41,792,380 | 58.85 | 53,372,025 | 80.11 |
| 1½-d. | 9,834,981 | 13.85 | None | . |
| 2d. | 14,156,317 | 19.94 | 9,812,603 | 14.73 |
| 3d. | 1,850,145 | 2.60 | 1,339,122 | 2.01 |
| 4d. | 1,139,025 | 1.60 | 417,046 | 0.63 |
| 5d. | 1,130,172 | 1.59 | 98,321 | 0.15 |
| 6d. | 702,599 | 0.99 | None | . . |
| 7d. | 50,978 | 0.07 | None | . . . |
| 6d. round trips | 10,588 | 0.01 | 71,100 | 0.10 |
| 7d. round trips | 80,217 | 0.11 | 347,627 | 0.52 |
| 8d. round trips | 48,812 | 0.07 | 316,942 | 0.48 |
| Miscellaneous | 212,441 | 0.30 | 849,540 | 1.27 |
| All passengers | 71,008,655 | 100.00 | 66,624,326 | 100.00 |
| Passengers per car-mile | 10.58 | ..... | 8.69 | ..... |
| Journeys per inhabitant | 182.00 | | 170.83 | ..... |
| Miles run per inhabitant | 17.19 | ..... | 19.65 | ..... |



**Dublin United Tramways Co. (1896), Ltd.** **1**

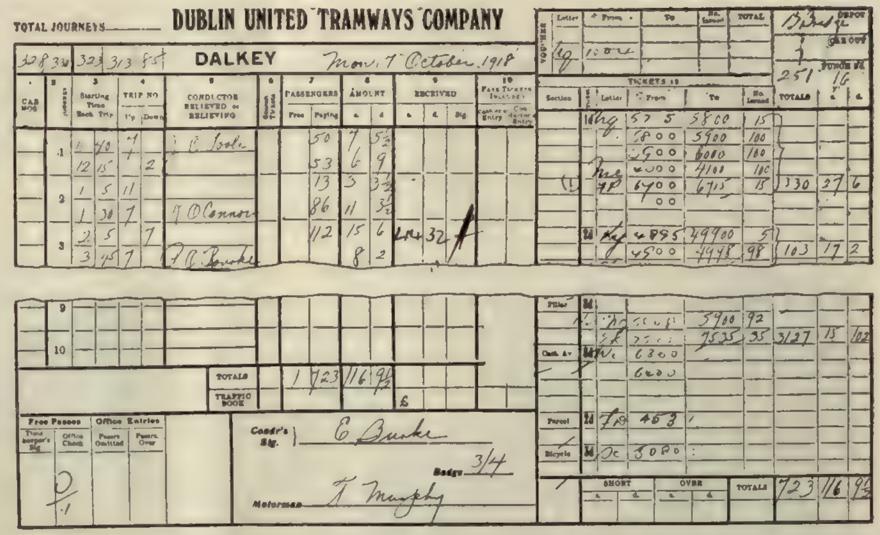
DALKEY Mon. 7 October '18

| Car No. Motor | Car No. Trail | Punch No. | Journey No | Car out |
|---|---|---|---|---|
| 311 | | 176 | 1 | 9 |

Trip — Time 11 40 — From Blackrock — To Pillar

| Free | Section | Fare | Ticket Letters | Starting | At Blackrock | At Terminus | Paid Passrs | s. | d. |
|---|---|---|---|---|---|---|---|---|---|
| | | 1d | Ud | 5785 | " | 5811 | 25 | 2 | 1 |
| | | 1½d | Ny | 5808 | " | 5811 | 3 | | 4½ |
| | | 2d | Ky | 4895 | " | 4906 | 11 | 1 | 10 |
| | | 3d | Fd | 7021 | " | 7027 | 6 | 1 | 6 |
| | | 4d | Jt | 7569 | " | 7574 | 5 | 1 | 8 |
| | Return Pillar | 4d | Cd | 2627 | " | 2627 | 0 | 0 | 0 |
| | Return Pillar | 8d | | | | | | | |
| | Return Cart. Av | 8d | | | | | | | |
| | Pavilion | 10d | | | | | | | |
| | Pavilion | 1/- | | | | | | | |
| | Parcel | 2d | Td | 3453 | " | 0453 | 0 | 0 | 0 |
| | Return Voucher | | Jo | 1004 | " | 1004 | 0 | 0 | 0 |
| | | | | | | | | | |
| | Bicycle | 3d | Sc | 5080 | " | 5080 | 0 | 0 | 0 |
| | TOTAL | | | | | | 50 | 7 | 5½ |

Total fares. Condr's Sig. E Burke Badge 314



TOTAL JOURNEYS

**DUBLIN UNITED TRAMWAYS COMPANY**

DALKEY Mon. 7 October 1918

Depot Bridge — Car out — Punch No. 251 16

| Car Nos. | Journey | Starting Time Each Trip | | Trip No Up | Trip No Down | Conductor Relieved or Relieving | Passengers Free | Passengers Paying | Amount s. | Amount d. | Received |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 11 | 40 | 4 | | C. Toole | | 50 | 7 | 5½ | |
| | | 12 | 15 | | 2 | | | 53 | 6 | 9 | |
| | 2 | 1 | 5 | 11 | | | | 13 | 3 | 3½ | |
| | | 1 | 30 | 7 | | T. O'Connor | | 86 | 11 | 3½ | |
| | 3 | 2 | 5 | | 7 | | | 112 | 15 | 6 | |
| | | 3 | 45 | 7 | | | | | 8 | 2 | |
| | 9 | | | | | | | | | | |
| | 10 | | | | | | | | | | |
| | TOTALS | | | | | | 1 | 723 | 116 | 9½ | |
| | TRAFFIC BOOK | | | | | | | | | | £ |

Free Passes: Time-keeper's Sig. — Office Check. Office Entries: Passrs. Omitted — Passrs. Over

Condr's Sig. E Burke

Badge 314

Motorman T Murphy

Tickets Issued

| Section | Fare | Letter | From | To | No. Issued | Totals | s. | d. |
|---|---|---|---|---|---|---|---|---|
| | 1d | Ng | 5785 | 5800 | 15 | | | |
| | | | 5800 | 5900 | 100 | | | |
| | | | 5900 | 6000 | 100 | | | |
| | | Ng | 4000 | 4100 | 100 | | | |
| | | | 6700 | 6715 | 15 | 330 | 27 | 6 |
| | 2d | Ky | 4895 | 4900 | 5 | | | |
| | | | 4500 | 4598 | 98 | 103 | 17 | 2 |
| Pillar | 3d | | | 5900 | 92 | | | |
| | | | | 7535 | 35 | 3127 | 15 | 102 |
| Cart. Av | 8d | | 6300 | | | | | |
| | | | 6200 | | | | | |
| Parcel | 2d | Td | 453 | | | | | |
| Bicycle | 3d | Sc | 5080 | | | | | |

Short s. d. — Over s. d. — Totals 723 116 9½

AT LEFT, DUBLIN CONDUCTOR'S WAYBILL FOR ONE-WAY TRIPS. AT TOP, CONDUCTOR'S MASTER WAYBILL FOR WHOLE DAY'S WORK

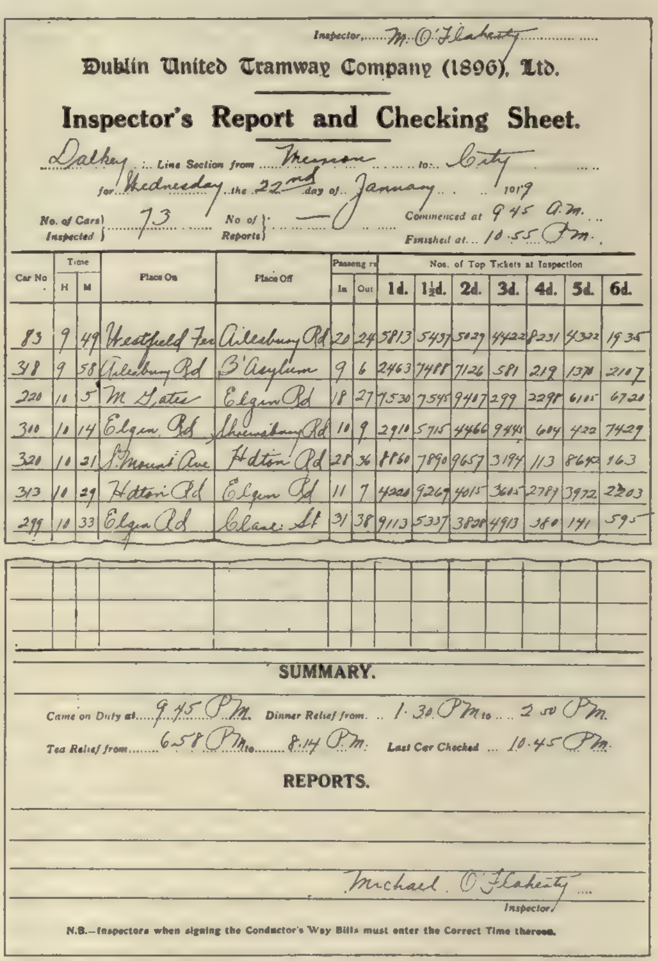
the round-trip (return) ticket has been abolished as well as the season ticket. Of special fares there are few. The number of workmen's cars run according to statute is very small in the morning, and at night only one such car is operated. School tickets are sold in penny strips at 3s. 9d. for sixty, which is a 25 per cent reduction. Similar strip-ticket books are also sold at full price to employers for the use of messengers. With regard to free riding for charities, the company finds it wiser to donate money. Thereby it discourages the idea that transportation costs next to nothing. Furthermore, such donations are more appreciated than passes, which would be considered a matter of course.

The standard fare receipts of the Dublin United Tramways carry zone numbers as illustrated, the two tickets without zone numbers being for end-to-end suburban runs. The use of numbers in place of names is, as noted in regard to Belfast practice, a great convenience in avoiding the printing of like rate tickets for different lines, and especially in meeting sudden increases in travel on a given line. The Dublin public, however, is not so pleased with the numbered tickets as with the kind that bears the names of the stages on the line used. Possibly an identification system on fare signs and poles would eliminate any uncertainties that now prevail.

### COLLECTING AND ACCOUNTING FOR FARES

Fares are collected within the car, and receipts are issued in the customary way. The London "Bell" punch is used on a rental basis, the charge for 820 punches averaging a monthly expense of about $1.25 to $1.50 per punch. Both the public and the conductors are so accustomed to the system that few fares are overlooked and still less are stolen, the abolition of short overlapping zones having much to do with this desirable condition. One day's report showed an apparent loss of only four fares on the entire system! On the city lines with the 2d. fare over all, it is to the passenger's interest to pay the full fare at once, for otherwise he will have to pay an extra half-penny as explained earlier in this article. Warnings concerning over-riding are not posted, as they would be resented.

The possibility of stealing where every passenger expects a receipt for the exact fare paid is very small. In rare instances, a conductor taking on a passenger in the last outbound zone might risk giving him no re-



Inspector M. O'Flaherty

**Dublin United Tramway Company (1896), Ltd.**

**Inspector's Report and Checking Sheet.**

Dalkey Line Section from Merrion to City

for Wednesday the 22nd day of January 1919

No. of Cars Inspected 73 No of Reports — 0 Commenced at 9 45 a.m. Finished at 10.55 P.m.

| Car No | Time H | Time M | Place On | Place Off | Passengers In | Passengers Out | 1d. | 1½d. | 2d. | 3d. | 4d. | 5d. | 6d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83 | 9 | 49 | Westfield Ter | Ailesbury Rd | 20 | 24 | 5813 | 5437 | 5029 | 4422 | 8231 | 4322 | 1935 |
| 318 | 9 | 58 | Ailesbury Rd | B'Asylum | 9 | 6 | 2463 | 7488 | 7126 | 581 | 219 | 1378 | 2107 |
| 220 | 10 | 5 | M Gates | Elgin Rd | 18 | 27 | 7530 | 7545 | 9407 | 299 | 2298 | 6105 | 6720 |
| 310 | 10 | 14 | Elgin Rd | Shrewsbury Rd | 10 | 9 | 2910 | 5715 | 4466 | 9445 | 604 | 422 | 7429 |
| 320 | 10 | 21 | S. Mount Ave | Hdton Rd | 28 | 36 | 8860 | 7890 | 9657 | 3194 | 113 | 8642 | 163 |
| 313 | 10 | 29 | Hdton Rd | Elgin Rd | 11 | 7 | 4220 | 9269 | 4015 | 3605 | 2789 | 3972 | 2203 |
| 299 | 10 | 33 | Elgin Rd | Clare St | 31 | 38 | 9113 | 5337 | 3828 | 4913 | 380 | 141 | 595 |

SUMMARY.

Came on Duty at 9.45 P.m. Dinner Relief from 1.30 P.m to 2.50 P.m.

Tea Relief from 6.58 P.m to 8.14 P.m. Last Car Checked 10.45 P.m.

REPORTS.

Michael O'Flaherty Inspector.

N.B.—Inspectors when signing the Conductor's Way Bills must enter the Correct Time thereon.

INSPECTOR'S REPORT AND CHECKING SHEET IN DUBLIN ceipt; or he might give him a receipt for what is actually the first inbound zone, hoping to pick up the discarded receipt and issue it to an inbound passenger from the end of the line. When detected, the conductor would say that he had already made up his way-bill for the outbound trip or else that he had put the ticket in the punch from the wrong side. Such fraud is so risky, however, that it is simply mentioned here as being a possibility and not a regular practice, because under the fare-receipt system the passenger has an interest in the conductor's actions which he cannot be induced to take otherwise. The success of this plan is indicated by the fact that the Dublin company does not count ticket punchings more than once or twice a day—a significant compliment to the honesty and the ability of Dublin conductors!

Of the twenty inspectors along the line, four supervise traffic and sixteen carry on ticket checking. The full force of ticket inspectors is on duty during the rush hours. During hours of normal traffic, a ticket inspector will board a car every three to five minutes. From the typical "Inspector's Report and Checking Sheet" reproduced, it will be seen that seventy-three cars were inspected between 9.45 a.m. and 10.55 p.m., except for dinner relief from 1.30 p.m. to 2.50 p.m. and tea relief from 6.58 p.m. to 8.14 p.m. The conductors do not initial the report for the boarding of the inspector. Whether or not conductors should do this seems to be a moot point among British tramway managers. Some hold that it is not wise to have a conductor act, seemingly, as a checker on his superior officer; others maintain that initialing of reports is an excellent way of avoiding disputes afterward.

On beginning the day's work, the conductor receives from his local carhouse clerk (called locally a "depot inspector") a box which contains his tickets, punch and waybills as transmitted from the head office. The all-day waybill gives the conductor his in-and-out times, starting numbers of tickets and other data shown on the form reproduced. This waybill formerly carried calculating tables, but this practice was found unnecessary in view of the tests which a new conductor must pass.

In addition to the all-day waybill, the conductor is supplied with waybills for his individual half or one-way trips on which he will find his times for the day written in for him by the depot inspector. The notations of punch number, journey number, etc., are written in by the head office. The conductor himself writes down the serial numbers of his tickets on every half trip and figures out the cash. He does not hold the cash until the end of the day but turns in as much as he cares to every two or three trips to the depot official, in the case of short lines, or to a boy sent to the car from a collector at Nelson's Pillar, in the case of the through lines. In each instance, of course, a receipt is tendered for the money collected. The individual waybills also go with the cash, but they do not have to correspond. It is only in the case of the last return with the all-day waybill that money and tickets must check. This master waybill is the one used for checking by the head office, whereas the individual trip waybills are the checking means of the local cash collectors and forwarders. The totals of one set must tally with the totals of the other set.

Cash is forwarded to the cashiers of the head office several times a day, but the boxes containing the punch, master waybill and unsold tickets of the individual conductors are returned but once daily. While one box is in use, the head office is preparing a second box for the conductor. Each conductor works two orders of serial numbers of tickets as a consequence of this system. Thus, if he begins a "3600" pad on Monday, he may get a "3700" pad on Tuesday, but on Wednesday he will have to work off the remainder of the "3600" tickets.

The general office comprises the following staff:

| Duty | Number of Employees |
|---|---|
| Receiving Department, under Chief Accountant: | |
| Issuance of tickets and punches, and checking of same when returned each day | 8 |
| Issuance of waybills and summaries to conductors | 3 |
| Audit or reconciliation of tickets issued and cash received | 8 |
| Cashiers (two during the day and one at night) | 3 |
| Total | 22 |
| Remainder of General Office: | |
| All accounting and general counting house work | 28 |
| General manager's, secretary's and traffic manager's offices, shares transfer, etc. | 2 |
| Stenographers | |
| Grand total | 60 |

Of the depot inspectors, who also carry on miscellaneous transportation duties, there are fourteen. There is also the cash collector at Nelson's Pillar, who is assisted by a boy.

GRAFTON STREET, IN THE HEART OF DUBLIN

CITY HOUSES FRONTING ON STEPHEN'S GREEN

VISUAL PROOF THAT THE BUSINESS SKYSCRAPER IS UNKNOWN IN THE IRISH CAPITAL

# Examining the Electric Railway Situation

**The Public Utilities Committee of the National Chamber of Commerce Is Told of Efforts Being Made in Leading Cities to Preserve the Carriers**

AT THE second hearing before the public utilities committee of the Chamber of Commerce of the United States, held in Washington on May 28 and 29, various experts gave their views of the electric railway situation and of efforts which have been made and should be made to secure relief. A preliminary note in regard to this hearing was published in the ELECTRIC RAILWAY JOURNAL of May 31, 1919.

The subjects discussed before the committee were of two general types. The first dealt with the electric railway situation in Buffalo, Cincinnati, Chicago, Cleveland and Connecticut, and the second with general matters like franchises, skip-stop economies and the present price situation. Detailed abstracts of the discussion on these latter topics will be included in this article. Since most of the information in regard to the railway situation in the communities named, however, was presented to give the committee members knowledge which readers of this journal already possess, only the "news" points contained in the various recitals will be mentioned here.

### EXPERIENCE OF TYPICAL CITY LINES

The situation in Buffalo, N. Y., was described by John W. Van Allen, attorney and vice-chairman of the committee on public relations of the "All-for-Buffalo" Committee (257 citizens). Mr. Van Allen said that in the Milburn 5-cent fare agreement of 1892 there is a eservation that the contract does not interfere with he right of the Legislature to establish rates of fare. n view of the Quinby decision, however, that whatver power the Legislature has over franchise rates has ot been delegated to the Public Service Commission, t is not certain that the commission can grant a higher are to the International Railway. This point, however, s now before the Court of Appeals for decision. If he commission does not receive power to act, a receiverhip is likely to result but efforts will be continued to et a service-at-cost plan through the Legislature, peraps with a compromise on joint control through the commission and the city. Buffalo, however, objects to he Massachusetts plan of a State guarantee of comany finances, for it believes that a community should ay for what it gets without asking even for temporary id from the State.

Both W. C. Culkins, director of street railways of incinnati, Ohio, and Walter A. Draper, vice-president incinnati Traction Company, discussed the local situaon. Mr. Culkins laid especial emphasis upon the elascity of the service-at-cost plan in this city and upon he reward for efficiency and economy on the part of he company. He also mentioned the fact that under a ervice-at-cost plan the adjustment of wages is a comunity affair, although the public has not yet fully ealized the fact that such a franchise is not solely a ompany proposition. In M. Culkins' opinion, the Cinnati ordinance gives all the advantages of municipal wnership without imposing upon the city and the public s disadvantages.

Mr. Draper directed attention to the non-desirability of providing in a service-at-cost franchise for such specific automatic fare revision as to make it impossible to adopt a zone system if riding decreased with higher unit fares. Moreover, he declared that the incentive reward to the company should not be abolished when the fare passed a certain point, as 6 cents in Cincinnati, for the inspiration to the company to do its best, and the right of the public to receive the best should not be limited because of economic forces beyond the company's control.

Britton I. Budd, president Chicago (Ill.) Elevated Railways, told of the efforts to secure higher fares in Chicago in order to offset the increased cost of labor and materials. In his opinion electric railways are in a deplorable condition, and unless the public can be led to pay the cost of service, insolvency and the consequent ill-effects upon the communities are certain. Mr. Budd urged that greater use be made of employees as publicity agents.

The great problem of electric railways is to prove their case, believes L. S. Storrs, president The Connecticut Company, so that the public will recognize the needs of the carriers and use the service. Mr. Storrs related how in one case, where the fare reached 7 cents, the people bought bicycles, one manufacturer even buying 1000 to sell to its employees on a weekly payment basis. Mr. Storrs felt that a small group of the public can be convinced personally and some through railway employees, but that it is more difficult to educate the politicians. Until the public understands its interest in good transportation, the politicians will not favor the railways.

### RESULTS OF CLEVELAND'S EXPERIENCE

Cleveland's nine years of experience with its service-at-cost plan was described by Fielder Sanders, street railway commissioner of that city. In Mr. Sanders' opinion the strong points of this franchise are these: (1) Close supervision of expenditures by the city; (2) absolute control of service (except employment). He criticised the franchise, however, for the lack of an incentive to efficiency and economy. In 1909 the city opposed the idea of a reward on the ground that the company would skimp in the interest of stockholders and in the long run injure them, and the company objected that the city would show a tendency to reduce the annual operating allowance by the amount of the company's savings in the prior year. Mr. Sanders stated that the management had operated the property in a good way but that some subordinates had displayed a tendency toward inefficiency. When the franchise recently came up for revision, he suggested an amendment modeled after the Montreal reward plan, but the people did not see the necessity of improving the franchise. Mr. Sanders also criticised the Cleveland plan on the ground that some method is needed for the regulation of labor trouble when the public interest becomes involved.

In regard to taxes, Mr. Sanders said that the Cleveland Railway pays the federal and state corporation taxes, the excise tax and the ordinary property tax, and it maintains the pavement between the tracks and one foot outside. There are, however, no paving renewals, no new paving construction, no franchise tax and no sprinkling and snow removal expenses. Just now the city officials are co-operating with the company to secure a reduction in the assessment for state taxes. Mr. Sanders believes that a company should maintain the paving along its tracks but that the imposition of other street expenses on the car rider is an improper form of taxation.

A query as to whether or not a service-at-cost franchise should contain a maximum fare limit elicited from Mr. Sanders the reply that the controlling element is public confidence. Electric railway men can devise a perfect franchise, but if the public does not believe in it it will not be granted. One way to get public support is to show that there is a limit to the fare, although theoretically there should be none. The franchise can then be amended if necessary, as the Cleveland one was last year.

### GENERAL MATTERS DISCUSSED

The two witnesses on the general topic of franchises were L. R. Nash, of Stone & Webster, Boston, Mass., and Halford Erickson, of Hagenah & Erickson, Chicago, Ill. The paper of the latter, who was not able to attend the hearing in person, will be abstracted in a later issue.

Mr. Nash presented to the public utilities committee reprints of his article on "Recent Developments in Service-at-Cost Franchises for Utilities" in the ELECTRIC RAILWAY JOURNAL of Jan. 4, 1919. He also described in detail the salient points of the various plans and expressed the conviction that the Philadelphia one has more elements of broadness and fairness than any other one. In his opinion, flexibility should be the chief aim, and he is not sure that it is wise to fix a definite fare schedule instead of leaving this to the supervisors appointed under the franchise.

The subject of prices was treated by T. S. Holden, economics investigator, Bureau of Public Works and Construction Developments, United States Department of Labor, and by Irving Fisher, professor of political economy, Yale University, New Haven, Conn. Their remarks are abstracted elsewhere in this issue.

John A. Beeler, consulting engineer, New York, N. Y., testified in regard to the advantages of skip stops, as the detailed abstract printed on page 1097 shows. He also stated his belief that in Washington, where the plan has been used in combination with rerouting, rescheduling and other improvements, the estimated annual saving of $250,000 for one company and of slightly less for the other company has been more than realized.

Mr. Beeler was of the opinion that the frequent-service safety car could be used to advantage on a very large part of the present mileage. The principal opposition will come from employees, but the cars should not be installed with the idea of reducing platform expenses, for business is increased. A company should start the use of such cars on some line where service can be doubled, thus keeping all employees, and then extend the use. Where the one-man car has been properly installed and fairly tried, its operation has proved to be a great success.

# Higher Prices Are Sure to Continue

## Failure of Fares to Correspond to Other Prices Is One of Most Conspicuous Examples of the Injustice of the Depreciated Dollar

BY IRVING FISHER
Professor of Political Economy, Yale University, New Haven, Conn.

I AM very glad of the opportunity to speak on the subject of prices of money, material and equipment in reference to electric railways. This is not because I am competent to speak from any special knowledge as to the particular materials and equipment of these companies. I shall speak entirely from the point of view of the general level of prices—in other words, from the point of view of the purchasing power of money.

In 1915 I testified on this subject in certain arbitration proceedings in Boston held to settle a wage dispute between the Bay State Street Railway and the union of conductors and motormen. I then took the ground that this railway should raise the wages of its employees in order that these should be adjusted to the lower purchasing power of the dollar—in other words, in order that their wages should overtake the high cost of living. I argued that any inability to pay such high wages could and should be remedied by raising the railway's fare.

These views were not accepted by a majority of the arbitration tribunal. The idea of raising fares, which was the key to the situation, was then too new to seem practicable. Since that time fares have broken away from the traditional 5 cents in many cases. The principle that fair wages ought to be paid just as truly as a fair price for copper or any other requisite of the railways, irrespective of the adequacy of the 5-cent fare, has been adopted by the United States War Labor Board as it had, previously to my testimony, been adopted by Justice Higgins of Australia.

The whole question is one of adjustment to a lowering purchasing power of the dollar. No adjustment should be repressed, and the sooner all the adjustments are made the better. All except one of these adjustments will be against the interests of the electric railways but that one, the adjustment of fares, can and should compensate, so far as compensation is necessary and just.

### NICKEL HAS DEPRECIATED FIFTY PER CENT

The truth is that the purchasing power of the dollar is to-day about one-half of what it was before the war and one-third of what it was in 1896. If, therefore, a 5-cent fare was just in 1896 and if the other factors in the case, wages, material, equipment, etc., have on the average risen proportionally with the general rise in prices, that is, are nearly three times what they were in 1896, then the "fair fare" for the companies should be to-day from 12 to 15 cents!

To put it the other way around, if to-day a 5-cent fare is just and expenses in 1896 were lower than now in proportion to prices in general, the just fare in 1896 should have been about 2 cents!

I do not venture to say which of these two statements represents the truth, or whether some intermediate statement represents it, for I am ignorant as to whether the expenses of the companies have risen proportionately to other prices and as to whether the profits of the companies in 1896 were fair or unfair. Both of these points, however, are capable of determination.

The failure of trolley fares to correspond with other prices is one of the most conspicuous examples of the havoc which has been played by depreciation of the dollar. The vitally important question is, will prices drop, or is the present depreciation of the dollar permanent?

While prediction in the economic field is always dangerous I am strongly inclined to believe, on the basis of considerable study of the subject, that this generation will never again see the pre-war price level, or anything like it, and that the dollar has suffered a permanent impairment of purchasing power.

To take a world-wide view, the money in circulation in the world outside of Russia has increased during the war from $15,000,000,000 to $45,000,000,000, and the bank deposits in fifteen principal countries from $27,000,000,000 to $75,000,000,000. That is, both money and deposits have been trebled; and prices, on the average, have perhaps trebled also. The conclusion is that in this war as in general, in the past, the great outstanding disturber of the price level has been money. What can be done about it? So far as the past is concerned, comparatively little. Bygones must largely be bygones. As far as wages and salaries are concerned, the remedy must be to raise them rather than to lower the high cost of living. While some kinds of work have had excessive wages during the war, this has not been true in general, public opinion to the contrary notwithstanding. I quite agree with Mr. Gompers that the wage level should not be lowered if it could. On the contrary, it should be raised to catch up with prices, just as was done after the Civil War. In the same way, the fares of electric railways should be adjusted to the new level of prices. But in regard to contracts little relief for past injuries can be expected.

### FIX THE DOLLAR'S PURCHASING POWER

The real culprit being the dollar, the real remedy is to fix the purchasing power of the dollar. In order to secure a dollar constant in its purchasing power over goods in general, it should, in effect, be a composite of these very goods in general. It would be just as simple then to keep the price of the composite package of say 100 commodities invariable (however widely its constituents might vary among themselves) as it is now to keep the price of gold invariable. The price of that composite would always be a dollar, just as to-day the price of gold is always $20.67 an ounce. [The plan of Professor Fisher for a "goods dollar" was summarized n the ELECTRIC RAILWAY JOURNAL of April 19, page 780—Eds.]

By all means, let us keep the metal gold for the good ttributes it has—portability, durability, divisibility, alability—but let us correct its instability, so that one dollar of it will at all times buy approximately that composite basketful of goods. Money to-day has two great unctions. It is a medium of exchange, and it is a tandard of value. Gold was chosen because it was a ood medium, not because it was a good standard. And o, because our ancestors found a good medium of exhange, we now find ourselves saddled with a bad stanard of value! The problem before us is to retain gold s a good medium and yet to make it into a good tandard.

The method of rectifying the gold standard consists n suitably varying the weight of the gold dollar. If e add new grains of gold to the dollar just fast enough compensate for the loss in the purchasing power of ch grain, or vice versa take away the gold to compensate for a gain, we shall have a fully "compensated dollar," a stationary instead of a fluctuating dollar, when judged by its purchasing power.

And if we circulate paper representatives of gold exclusively, instead of including any gold coins, monthly changes in the weight of the gold dollar can be made even more easily than the occasional changes were made which history records. In actual fact, gold now circulates almost entirely through "yellow-backs" or gold certificates. The gold itself, often not in the form of coins at all but of "bar gold," lies in the government vaults. It would therefore be little more than expressing in law an existing custom if gold coins were abolished altogether.

If gold thus circulated only in the form of paper representatives, it would evidently be possible to vary at will the weight of the gold dollar without any such annoyance or complication as would arise from the existence of coins. That is, each month the proper government bureau would calculate from current market prices how much would have to be paid for the composite basket of goods. This figure it would publish, and this figure would then afford the needed official sanction to the Secretary of the Treasury to change the rating of the gold dollar—that is, to change the amount of gold which the mint would give or take for a gold certificate, and thus increase or diminish the purchasing power of that certificate.

The result is that the price level would oscillate only slightly. Instead of there being any great price convulsions, such as we find throughout history, the index number would run, say 101, 100½, 101, 100, 102, 101½, 100, 98, 99, 99, 99½, 100, etc., seldom getting off the line more than 1 or 2 per cent.

# Present Conditions Fix "Normal" Prices

### Utility Owners Have the Right to Expect Public Authorities in Determining Fares to Consider Operating Conditions and Production Costs That Prevail in 1919

BY THOMAS S. HOLDEN
United States Department of Labor

MUCH has been said and written as to whether prices are fair or whether they represent excess profits; as to whether present high levels can be maintained or will decline to a level near that prevailing before the war. Some statements have been wisely made; much that has been said has been beside the point.

It is not surprising that the price situation has bewildered many of the most intelligent business men. It has been stated by a competent authority that the purchasing power of the money of the world has shrunk more during the four years of war than it did during the four hundred years from 1300 to 1700. Prof. Irving Fisher has called what has taken place "a price revolution"; this name designates most accurately what has occurred.

The bewilderment of intelligent men concerning the price situation has been largely due to the fact that most have had to learn to think correctly about prices. We have thought one way with one side of our brain in our capacity as buyers, and we have thought another way with the other side of our brain in our capacity as producers and sellers.

In our capacity as buyers of commodities we have proceeded on the assumption that it was desirable for prices to fall. Falling prices, however, rarely stimulate business. They usually stimulate waiting for further declines. A period of falling prices is usually a period of business depression. The past six months has been remarkable for the small number of business failures. It is entirely possible that a sharp decline in prices might have been accompanied by a greater number of business failures than there has been, attended with a much greater menace of unemployment. A financial panic might have been within the bounds of possibility.

### WHAT IS NORMAL PRICE?

Many of those who have been deferring building projects and the resumption of production of commodities have stated that they were waiting until prices and wages should have returned to "normal." The word "normal" has been used extensively in this connection and most of those who have used it have not appreciated the true meaning of the word. Not only in connection with prices and wages has this term been used incorrectly, but courts and public utility commissions have used the term loosely when speaking of valuations of properties.

Just what does this word "normal" mean? In a paper entitled "Appraisals and Rate Making," read on March 20 at the annual meeting of the Illinois Gas Association, Cecil F. Elmes presented with the utmost clarity and force certain aspects of the price situation as affecting valuations of public utility properties and the principles of rate making. In the course of his discussion Mr. Elmes dwelt at some length on the misconception of the term "normal." He presented curves showing the fluctuations of prices in England on five basic articles, wheat, iron, lead, cattle and sheep, covering a period of six centuries. He also presented curves showing fluctuations of artisans' wages, both in terms of money and in terms of the quantity of wheat the wages would buy, covering the same extended period. He pointed out that in the case of each one of these curves the fluctuations are so erratic that it is impossible to draw a horizontal straight line, an oblique straight line, or a mathematical curve which can in any sense serve as an axis about which the prices or wages fluctuate. Consequently it is not possible to define mathematically in terms of past experience the "normal" price of a given commodity, or "normal" wages. Nor is it possible to thus define a "normal" rate of increase in prices or wages.

### PRESENT COSTS DETERMINE NORMALITY OF PRICES

Not everyone has the opportunity to consult the records of the British museum, as Mr. Elmes has had, for the purpose of studying this subject. There is, however, another authority which is readily accessible to all, *Webster's Dictionary*, which defines the term in connection with economics as follows:

> Pertaining or conforming to a more or less permanent standard, from which, if the individual phenomena deviate on either side, such deviations are to be regarded as self-corrective. This, in economics, the normal price is a price which corresponds to the cost of production.

The standard to which a price must confirm is, therefore, not necessarily a price to which we are now accustomed or were accustomed five years ago. Mr. Elmes has shown that past experience has established no mathematical standard to which a price may be expected to conform. Webster says that the standard is the cost of production. In 1919 the standard is the cost of production in 1919, and not the 1914 cost of production. There is no justification for the assumption that $12 is an unfair price for a pair of shoes today simply because the same pair of shoes might have been bought in 1914 for $6. The only criterion for the present price of shoes is the present cost of production of the shoes plus a reasonable margin of profit to those concerned in the making and the selling of the shoes.

Similarly "normal" wages in 1919 must not necessarily conform to the wage scale of 1914. "Normal" wages in 1919 must cover the cost of living in 1919 with a reasonable margin.

Similarly, the fact that the customary street-car fare in the past has been 5 cents is not necessarily an indication that a 5-cent fare is the "normal" fare in 1919. As in the case of prices and wages, the standard of the rate to be paid for the services rendered by any public utility corporation is not fundamentally the rate the public has been accustomed to pay, but the cost of production of the commodity that is being sold, whether it be gas, electric power or transportation.

In connection with valuations of public utilities and the fixing of rates, although the basic principle which applies to the price of commodities and wages of labor and valuation of real estate constitutes the standard of normality, it is fully realized that, in practice, restrictions, legal and otherwise, operate to modify the application of this principle. It is evident to all, however, that as long as these properties are owned and operated by private interests the return must ultimately be in proportion to the cost of production of that which is sold to the public. When operated by the public through government officials, if the rates paid for the service are not sufficient to cover the costs, the deficit has to be paid out of public funds.

### MONEY SUPPLY INFLUENCES PRICES

If a curve representing the average of prices of a great number of basic commodities be drawn, the fluctuations are much less marked than those of any particular commodity. Prices and productions costs, which constitute the norm of prices, are measured in terms of money. Wages and the cost of living, which is the norm of wages, are measured with this same yardstick, money.

During the last forty-six years, in the United States, the curve of the price index for basic commodities has kept very close to parallelism with the curve representing the stock of legal tender in the country.

According to figures of the Bureau of Labor Statistics the maximum level of wholesale prices of basic commodities was reached in September, 1918, the index figure being 207. This figure is based on the average for the year 1913 as 100. The index figure for February was 197, for March 200 and for April 203. Weekly quotations continue to show more commodities advancing than declining. Thus it is seen that the price level is again within hailing distance of the maximum. The question today is not whether prices will fall or how much they will fall; it is rather how much higher will they go? The cost of living is still increasing and the dollar is still on the decline. The problem is to arrest this decline in the purchasing power of the dollar.

During the last few months there has been evident a growing tendency on the part of the public to accept present prices and to wait further only for some assurance that prices would not fall. The growing volume of building operations throughout the country indicates that the public has largely given over its policy of waiting. The Department of Labor is daily in receipt of statements from leaders in business and finance attesting the correctness of the statements it has published concerning prices.

### WORLD-WIDE CONDITIONS PROHIBIT PRICE-LEVEL RECESSION

It took thirteen years after the Civil War for wholesale prices to get back to the prewar level. The circumstances of that period were much more favorable for price reductions than they appear to be at the present time. As compared with the war just ended the Civil War was a purely local affair.

The reason why the present situation has been so difficult to understand is the fact that it is a world-wide phenomenon. The scope of the economic changes has been as wide as the war itself. In January of this year the Bureau of Labor Statistics' index figure for wholesale prices of all commodities showed an increase of 102 per cent over 1913. At the same time the price level in England was 117 per cent higher than in 1913; In France it was 249 per cent higher. It is a signifiant fact that France, which showed such a marked rise n the price level, resorted to inflation to a much greater xtent than did either England or the United States. n England and in Americe it has been considered wise o pay a large proportion of the expenses of the war hrough the levying of heavy taxes, thus minimizing he necessity for extension of the public debt and the nflation of currency. In those countries where it was onsidered expedient to avoid high taxation and to reort to inflation the people are now paying the piper hrough the high prices they are obliged to give for the ecessities of life.

Whether you believe with the majority of economists hat the price level is the result of the amount of money, r whether you agree with the minority that the quanty of money accomodates itself to the price level, the resent condition of world-wide high prices accomanied by a world-wide increase of money and credits ust be considered. Either prices in the future will e less because of a contraction in the amount of legal ender, or lower prices in the future must be accomanied by a decrease in the amount of legal tender. ence the problem of future prices depends upon the lution of the financial problem and a solution of that an not be wholly controlled by any one country.

Lord D'Abernon, an eminent British financier, has een quoted as follows:

> If there were to be any attempt to-day to bring about a pid return to the gold currency basis of 1914, it would most double the weight of the world's indebtedness and uld certainly lead to the bankruptcy of many nations.

The governments which have borrowed cheap money uld, in the case of contraction, have to re-pay with ar money. Individuals who have borrowed cheap oney would have to pay back with dear money. It is tremely unlikely that the governments of the world n be reasonably expected to decrease appreciably the rld inflation within a brief period of years.

### PRODUCE MORE GOODS

The best way for Americans to set about arresting e shrinkage of the dollar is to produce more goods, us remedying the existing disparity between comdities and money. But great as is the actual and potential demand in this country for consumers' goods, perhaps even more insistent is the demand for houses. Scarcely second to this need is the necessity of making many repairs and improvements in the various systems of transportation and other public utilities.

The public has a right to expect that its servants will safeguard its proper interests in whatever adjustment of rates is made. The owners of public utilities have equally a right to expect the public officials to take into consideration operating conditions and costs that prevail in 1919.

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# Economies of the Skip-Stop

## Skip Stop on Basis of Elimination of One Stop Per Mile, at 1.3 Cents per Stop, Will Save $30,000,000 Annually

BY JOHN A. BEELER
Consulting Engineer, New York, N. Y.

THE importance of the skip stop as a method of improving operation for electric railways by speeding up schedules and reducing the energy consumption through the medium of eliminating unnecessary stops has recently attained national prominence.

In horse-car days, which began in New York in 1829, the horses stopped when they heard the bell. With the advent of cable cars, which first appeared in San Francisco on Sutter street in 1873, a notice was carried to the effect that "Cars will stop at street corners only and cannot stop on curves." This was the beginning of the skip-stop system.

As the horse-car lines were electrified and new electric lines built, some companies followed the horse-car method of making stops at any point, while others spaced them out more in accordance with the cable practice. The first commercial electric railway in the United States was the East Cleveland (Ohio) Horse Railway, which was started in 1884. The electric cars, which were operated by the underground system, were run between the horse cars on the same track and on the same schedule. Cleveland also was the scene of the first comprehensive effort to eliminate stops, when in 1912 under the direction of Peter Witt, then street railway commissioner, the plan proved a marked success. The example was followed by a number of other cities, where the skip-stop system was used to a limited extent.

### WASHINGTON FOUND THE SKIP STOP A BENEFIT

With the coming of the great war, the adoption of the skip stop was speeded up. In Washington, D. C., for example, the great influx of war workers congested all transportation facilities to such a point that the service was breaking down. One of the methods advanced by the writer to clear up the congestion on the principal streets of the business district was the elimination of all unnecessary stops. The first step in this direction was taken in the vicinity of the Treasury Building, where on Feb. 17, 1918, one-half the original stopping places were eliminated. The effect was so marked that on April 7, 1918, the plan was extended over a large share of the business district and on April 21, 1918, was made to cover the entire District of Columbia. Altogether the railways eliminated about a third of the former stopping places, leaving an average of slightly less than eight to the mile.

The effect of the skip stop in this case was immediately advantageous. The running time was reduced an average of 13 per cent. Especially in the rush hour cars which had formerly run late were able to keep on schedule and get to the end of their trips on time. This resulted in great benefit to the public, as eighty-seven cars under the new conditions were able to do the former work of 100. This gave the company the advantage of additional equipment—though it was unable to purchase more cars under war conditions—and the public had the advantage of improved transportation.

The indorsement of the plan was nearly universal, only thirty-three complaints being received from a population of half a million. Not a single one was made against the principle of the skip stop.

### SKIP STOPS SAVE TIME

The skip stop properly applied is nothing more than a means of correcting an inheritance of the horse-car days. It is self-evident that the more often a car stops the slower its progress is. An ordinary street car has a free running speed of about 20 m.p.h. Without any stops it will make a mile in three minutes. Require it to make eight stops to the mile and it will have a reduced speed of 10 m. p. h. and take six minutes for a mile. If it must make fourteen stops to the mile, the speed will be reduced to 7 m. p. h.

Eight stops to the mile—every 660 ft.—means that the motorman must throw off the power, apply the brake and bring the car to rest, the doors must be opened and closed and then the motorman must release the brakes and feed up the power—every forty-five seconds. One-half the time of all persons on the car is spent in making these stops.

The importance of controlling the number of stops is apparent. For example, consider a passenger making a 2-mile trip. If fourteen stops per mile are required, the passenger will consume seventeen and one-tenth minutes in riding the full distance. With but eight stops to the mile, the ride will take twelve minutes, five and one-tenth minutes being saved. There will be a slight addition to the average walk, amounting to about 70 ft. at either end, which will take four-tenth minute additional. Thus the net gain through the stops being reduced from fourteen to eight per mile is to save the passenger four and seven-tenth minutes. If the trip is longer, the gain will be correspondingly more.

The amount of service that can be given with a certain equipment is entirely dependent on the number of stops that must be made. I have seen many lines where the points designated as stopping places average as high as eighteen to twenty per mile. True, cars do not stop at every point each trip. But on certain trips, especially during the rush hours, the cars are making an excessive number of stops. It is then that the fatal effect of the too-frequent stops becomes apparent. Either the cars are hopelessly delayed or else schedules are slowed down and the public delayed during the period when the demand for service is most urgent. Extra cars must be furnished for the sole purpose of making the additional stops, without adding one bit to the service. In some congested cities the situation has been so bad that with more cars added the speed was reduced so much that actually fewer cars per hour were moved along the street.

As a means of relief, a reduction in the number of possible stopping places makes a marked improvement. Not only does it save the time consumed in making the stops, but it aids the schedule maker by giving him a much more definite idea of what is likely to happen on each trip. With a definite basis to work on, he can place the equipment where it will afford additional service to patrons instead of being used to make extra stops.

### METHODS OF ELIMINATING STOPS

In reducing the too numerous stops of the past, electric railways have used a number of methods with justice to all the car riders. The recognized arrangements of skip stops are: Simple, staggered, odd-and-even, selective, arbitrary or measured, and express and local.

In the simple skip stop every alternate corner is eliminated as a stopping place, stops in both directions being made at the same street. The staggered skip stop calls for a stop at alternate corners by inbound, and at the remaining corners by outbound, cars. The odd-and-even system is a modification of the last, applicable principally to the cities with numbered streets. Cars marked "odd" stop at odd-numbered streets, and those marked "even" stop at even-numbered streets. With the selective system the locations for stopping places are determined with reference to the traffic, without rigid adherence to the uniformity of the spacing. The arbitrary or measured method, sometimes known as the European plan, locates the stops at even distances apart without reference to the street intersections or the character of the territory served. The express and local method is self-explanatory, being an application of the steam railroad method of designating certain points as express stops.

### SKIP STOPS SHOULD BE MAINTAINED

In addition to being a time-saver for the public, the skip stop saves coal for the railroads. With proper operation, a reduction in power comparable with the gain in speed can be made. After the successful installation in Washington, the United States Fuel Administration determined to advocate the general introduction of the skip stop in all cities of more than 25,000 population in order to save fuel for war purposes. An order was issued and the skip stop was installed beginning August, 1918, a spacing of eight stops per mile in city districts being recommended. Unfortunately it was hastily put in on some lines, without shortening schedules or affording patrons any benefit whatever. In such cases the public, seeing no feature but the inconvenience resulting from this arrangement, has since demanded the abolition of the practice.

A very great reduction in accidents of different classes has followed the adoption of the skip stop, according to the actual records kept in Detroit and Philadelphia. The reduction has been especially marked in boarding and alighting accidents and collisions.

In round figures the electric railways of the United States are now operating 2,500,000,000 car-miles and handling 15,000,000,000 passengers annually. They are earning on the average about 32 cents per car-mile, the operating expense being about 23 cents on a ratio of 72 per cent.

The total investment is approximately $5,000,000,000. The gross receipts are about $800,000,000, making a $6 investment per $1 of business. After the payment of operating expenses of 72 cents, there remains 28 cents on each $1 received. This is equal to 4⅔ per cent on the investment, from which must be provided interest, depreciation and replacements. It must be remembered that this includes all lines, good, bad, and indifferent. Many of the latter should never have been built.

Electric railways are to-day carrying more people and taking in greater receipts than ever before in their history. It is indeed a significant fact that in the face of the tremendous increase of automobiles in daily use, the demand for good street-car service was never so great as to-day.

If the skip stop does nothing more than save one stop per mile, it will at 1.3 cents per stop, as estimated by J. F. Layng, engineer of the United States Fuel Administration, save more than $30,000,000 annually. This important saving warrants that the skip-stop-plan be installed with great care in order to insure its permanency. Making eight stops per mile a car will make a schedule speed of 10 m. p. h. but with ten stops the speed is reduced to 9 m. p. h. With average car earnings at 32 cents, the slower schedule will earn but $2.88 while the faster one will bring in $3.20 per car-hour. As the great bulk of all the expenses are controlled by the time element feature, the importance of this fact is apparent. Savings through the skip stop and through other legitimate means, such as rescheduling, rerouting, reduction of lost time and lost motion, and the use of safety cars wherever practicable, will enable many a company to show a good balance on the right side of the ledger.

# Side Lights on the Zone Fare—Good Service Absolutely Essential

## No Matter How Low the Fare, Short Riders Cannot Be Developed Unless They Can Be Offered Comfortable Travel

BY WALTER JACKSON

WHOEVER has had the opportunity to analyze classification of passengers according to individual maximum length of ride cannot fail to observe that the British tramway has a much greater proportion of patrons to whom a car ride is not a necessity but merely a convenience. Roughly speaking, the minimum fare passengers of Great Britain's street railways are about half of the total. Although the unit-fare American systems do not offer the same valuable differentiation in length-of-ride data, we know from the few surveys made to get such statistics and from the traffic shrinkage immediately following an increase in fare that the same class of short-ride traffic is nearer 15 per cent than 50 per cent.

The difference between these percentages goes a long way toward explaining the operating philosophy of unit-fare *vs.* distance-fare properties. The unit-fare operator inevitably comes to think in terms of expense reductions because he feels that most of his passengers must use the cars in any case; hence the temptation to handle the same number of riders in bigger cars at longer intervals with fewer men. Just as inevitably the distance-fare operator comes to think in terms of income increases because he knows that a reduction in service will cut down the largest and most promising part of his business.

Since no exceptional talent is required to reduce mileage, it is easier to get on in the first class of properties, but only too often a penny saved is a nickel spurned. It requires courage—a willingness to try new ways—to seek to increase the net by adding service that creates travel.

If American operators feel that the war did dreadful things to them, let them contemplate what happened to the British managers who saw nearly 80 per cent of their tried and true men go forth to the carnage of war, who had in many cases to pay double wages for their help plus war allotments to the families of the men in the field, who experienced greater difficulty probably than Americans in getting repair and maintenance material during the war and who had to endure a coal shortage that was not confined to Mondays but froze on all through the week.

And did the British manager trained in selling transportation make any reductions in service voluntarily? Not one that we know or heard of! Service reductions there were; but they were reductions compelled by man shortage, car shortage and fuel shortage. These hunters of the short rider knew that they could not afford to let the street railway's only dangerous competitor—the human foot—get into its stride. Accordingly, each and every one of them was only too anxious to restore pre-war conditions as rapidily as possible.

From their policy it is clear that frequent service and good service are of prime importance in building up short riding. No fare, no matter how low, will induce a walker to board a car unless that car comes before he is well on his way and unless that car has seats available or in early prospect. He is not asking for speed or costly fixtures—he is asking only for reasonable comfort.

So here we have arrived at the natural answer to those who ask: "Won't we be plagued during the peak load with a lot of short-ride undesirables?" No, fear not. The short rider will let you severely alone during those hours when most of your passengers are long riders anyway. But if you are giving reasonably frequent service during the off-peak hours, the shopper, the solicitor, the carpenter, the plumber, the delivery clerk, the teacher, the pupil and the pleasure rider will fill seats that now are empty.

# Important Hearing on Mail Pay in New England

New England electric railway circles are keenly interested in the hearing to be given at Boston, Mass., on June 13, by the Interstate Commerce Commission upon rates of compensation for carrying mail. This is one of the series of hearings throughout the country beginning in Washington on June 9.

The New England Street Railway Club has appointed the following committee to represent its members at the Boston hearing: Chairman R. B. Stearns, first vice-president Bay State Street Railway, Boston; Clarence K. Reed, general auditor Boston Elevated Railway; and D. P. Abercombie, vice-president and general manager Northern Massachusetts Street Railway, Greenfield, Mass.

The New England committee has sent a questionnaire to about sixty companies, asking for comparative financial data and other information which will enable the case to be thoroughly presented. It is earnestly requested that all possible co-operation be rendered in the forwarding of the desired material. A large attendance is expected at the Boston hearing, which will be held at 10 a. m. at the Federal Building, First District Court room.

# American Engineering Standards Committee Adopts Revised Constitution

### New Plan Involving Enlargement of Scope and Change of Name to A. E. S. Association Has Been Submitted to Government Boards and National Societies

THE raison d'etre, organization and proposed procedure of the American Engineering Standards Committee were comprehensively set forth in the presidential address of Comfort A. Adams before the American Institute of Electrical Engineers in February. (See ELECTRIC RAILWAY JOURNAL, March 1, 1919, page 407.) A plan for the enlargement of the organization was explained by Dr. E. B. Rosa, chief physicist United States Bureau of Standards, in the issue of this paper for May 3, 1919, page 859. This plan has now progressed to the point where a tentative draft of a revised constitution has been approved and adopted by the committee and is now before the interested governmental bureaus and national societies for their consideration.

The committee has prepared a statement of the situation, from which the following digest has been made:

In the first place the new constitution replaces the committee name by "The American Engineering Standards Association," more adequately to suggest the scope of its activities.

The objects of the association are stated as follows: (1) To unify and simplify the methods of arriving at engineering standards, to secure co-operation between various organizations and to prevent duplication of standardization work. (2) To promulgate rules for the development and adoption of standards. (3) To receive and pass upon recommendations for standards submitted as provided in the Rules of Procedure, but not to initiate, define or develop the details of any particular standard. (4) To act as a means of inter-communication between organizations and individuals interested in the problems of standardization. (5) To give an international status to approved American engineering standards. (6) To co-operate with similar organizations in other countries and to promote international standardization.

Means are provided for increasing the number of representatives in the association by invitation or on request. Several important organizations interested in standardization will be invited to appoint representatives as soon as the necessary power is obtained.

The routine work of the association will be conducted by its secretary under the direction of a board of directors. This board will have power to deal with all of the affairs of the association except the final approval of the standards submitted to it.

Any organization may request the association to approve standards which it has formulated, or to approve committees that it has appointed, and by so doing becomes a "sponsor society." Such a request is entirely at the option of the organization that has formulated or expects to formulate the standard. At the request of the sponsor, approval of the standards is given when they are the substantially unanimous conclusions of a committee made up as follows:

(a) Sectional committees dealing with standards of a commercial character (specifications, shop practices, etc.), shall be made up of representatives of producers, consumers and general interests, no one of these interests to form a majority. A producer is a person, or the representative of a firm or corporation, directly concerned in the production of the commodity involved. A consumer is a person, or the representative of a firm or corporation, that uses the commodity involved, but is not directly concerned with its production. General interests include independent engineers, educators, and persons who are neither consumers nor producers, as defined above.

(b) Sectional committees dealing with scientific or non-commercial standards shall consist of persons specially qualified, without regard to their affiliations.

It is anticipated that in nearly all cases the approval of standards and committees by the association will be requested. In case it is considered advisable, the association is authorized to call a meeting of those who would be interested in the formulation of a new standard or the revision of an old one, to select one or more sponsor societies. The sponsor society or societies will appoint a sectional committee to formulate or revise the standard. This sectional committee will report to the sponsor when its work is completed. The sponsor may then request the association to approve. The association deals only with the sponsor and acts only at its request. Provision is made in all publications that a standard must be referred to as that of the sponsor, using whatever title the sponsor has given it, followed by the statement "approved by the American Engineering Standards Association." The approval may be given as "recommended practice," "tentative standard" or "standard," the expectation being that nothing will be approved as standard until it has shown that it is generally acceptable.

The association thus acts only to bring together those interested in a common object, and when they have completed their work, will at their request, certify that it has been done in such a manner as to justify its adoption. In addition to assisting in the selection of committees and certifying that their work has been done under proper conditions, the association will act as a bureau of information regarding standardization. It will collect information regarding existing standards and as to the bodies that have formulated and adopted them. This will enable it promptly to give necessary information to those who select a committee to formulate a new standard or revise an old one. It will also enable it to furnish information desired by the working committees regarding what has been or is being done on similar or related lines. It will establish relations with similar bodies in other countries.

# Canvass of Local Chambers of Commerce

The public utilities committee of the United States Chamber of Commerce, which is holding a series of hearings in regard to the general electric railway situation, is planning to send out to all local chambers of commerce a questionnaire on the subject. The purpose is to have these bodies give their views in regard to electric railway franchises, operating economies, taxes, the public interest in good transportation and the price situation. General information along these lines, as brought out by witnesses at the first two hearings before the committee, has been published in ELECTRIC RAILWAY JOURNAL of May 3, 10 and 31 and in this issue.

# Rehabilitation of French Tramways

### Condition of Those In and Near the War Zone Described by an Eye-Witness—Many Destroyed and All French Tramways in Poor Physical Condition—Extension of Credit by American Manufacturers Necessary If Sales for Renewing Properties Are to Be Made

By DANIEL T. PIERCE
Recently with the American Red Cross, Paris

WHY FRENCH ELECTRIC RAILWAYS CANNOT RESUME OPERATIONS —A TROLLEY BRIDGE IN THE DEVASTATED REGIONS BLOWN UP AS THE GERMANS RETREATED IN OCTOBER

THROUGHOUT the strip of territory, extending from Ostend to Nancy, which constitutes the devastated region of Belgium and France, there is to be observed almost total destruction of electric railways, including track, structures and rolling stock. In Ypres everything is destroyed. It is one of those cities which now consist of only a few walls and is not to be rebuilt, if we can believe the reports as to the determination of the Belgian government. Lille and Valenciennes are next encountered. Lille was a big industrial city and had several lines of electric railway, all of which were abandoned during the long period of German occupation, largely on account of the scarcity of coal. The scarcity was even more severe immediately after the armistice. People who are freezing can get along without even electric lights and railways. In January the track was in deplorable condition, and no steps had been taken to restore the service. In fact part of the motor equipment had been carried away, along with great quantities of textile machinery—some of it originally bought from German makers! Almost identical conditions existed in Valenciennes.

Arras is a scene of complete destruction and desolation, as is also Cambrai. If the latter city ever had any electric lines no sign or vestige of them remain—not, that is, in such shape as to be noticed by a casual visitor who was not searching especially for the remains of railways.

Amiens, the next large city, is in much better condition. It is officially stated that only 25 per cent of Amiens is totally destroyed, meaning that twenty-five out of every 100 houses are classified as not being worth rebuilding or repair. Even before the armistice the electric power plant was in operation and shortly afterward a few electric cars were run in a desultory way over routes that were not obstructed by demolished buildings. If the electric railways of the city were found to be 25 per cent (much less 75 per cent) intact, I should be surprised, but this is not an estimate made on the basis of exact information; it is merely the impression that one gets from visiting the city three or four times, at different intervals before and after the armistice was signed. Péronne and St. Quentin are in the same classification as Cambrai — almost totally destroyed—railways in common with every other utility, including the water supply, being non-existent.

Montdidier, Beauvais and Compiègne present quite different conditions. They were shelled but little, only badly bombed. Such railways as they had are in about the same state as the towns themselves—shattered here and there, and where intact badly worn and down at the heel. Château Thierry had only one electric line running along the river, the larger part of the town lying on the side of a steep hill which rises northward. The track had not been restored in February when I last visited the town and only temporary bridges crossed the river.

Soisson had not attempted to restore electric traction as late as March. What I saw of its track, overhead and depots suggested that there might be a salvage of perhaps 25 per cent of the plant formerly operated. In Rheims, another large city of a population of more than 100,000, there is practically nothing left of the electric lines. The four years of shelling which destroyed all but fifteen out of 15,000 dwellings, not to mention other structures, tore up the track and demolished the overhead, and repeated direct hits by shells of enormous caliber reduced the carhouses to masses of twisted iron, half-burned cars and debris. On some of the very narrow streets the feed wire was carried on arms projecting from the walls of houses. Even these were gone for stretches of several blocks. I happened to be following a car track in Rheims last year in the hope that it would lead to the railroad station. It ended in a huge shell hole, which combined with the debris from houses on either side completely blocked the street. This perhaps will give some idea of the condition of electric railways in Rheims and elsewhere in the war zone.

The few kilometers of track in Châlons and Épernay, which were on the southern edge of the devastated region, were operated after a fashion with the exception of a few months. The cars and equipment appeared to be fit only for the junk pile. I cannot recall seeing any electric railway in Ste. Menehould and Bar-le-Duc, although the latter city probably possesses the usual single-track line through the town, but certainly not on the main street. Verdun on the other hand had rather an extensive system, all of which is wiped out and must be replaced *in toto.* In Toul and Nancy on the other hand the railways operated throughout the war and, relatively speaking, are intact—if that is a proper term to apply to railways which have had no maintenance for more than four years.

### CARS THAT RUN ON THEIR NERVE

In Paris and Lille the tram lines appear to be in fair condition; the equipment is in better shape than the track because the latter has gone to pieces along with the total abandonment of street repairs of all kinds. In Bordeaux, Tours and other cities and towns in middle and southern France the condition of electric lines, is, of course, deplorable by reason of the long-continued lack of maintenance and replacement. The equipment, like the Paris taxicabs, impresses one as something likely to fall to pieces at any moment. "How on earth do they keep running?" an American in Bordeaux asked, as a double-decked rattle trap swayed down the quay. "On their nerve, I guess," was the most satisfactory answer that could be given.

And that is how most of the machinery, electric railways, motor trucks, and other moving equipment in France has been kept going during the war. Every man in France was mobilized and every ounce of man-power was needed for the war. If a thing did not directly contribute to the winning of the war it was of no account. The steam railways were fairly well cared for, but France had few if any heavy electric or interurban lines. Electric railways therefore were not important for transport of men or munitions, and France has let them go to pieces. The Frenchman, however, has a gift for making things go. His motor transport during the war was disreputable in appearance but it kept on going. A motor car that an American would push into the ditch and abandon would be coaxed along indefinitely by a Frenchman. French cities therefore will probably keep their lines going somehow where there is anything left of them.

### PRESSING NEED FOR ELECTRIC RAILWAY MATERIAL

But evidently there is a pressing need for vast quantities of everything that goes into the making of an electric railway. France could not in many years make this equipment; she must buy it here or in Britain or elsewhere—everything from rail to power-house equipment. France bought largely of electrical equipment from Germany; that supply is now eliminated unless the rest of the world forces France to buy from the only seller who will give her reasonable prices and long credit.

That practically all the electric railways in France are municipally owned will, of course, deter purchases from her enemies. The feeling against Germany is, however, only a deterrent; it is not an absolute bar against trade with Austria and Germany. As between a friendly seller who asks much the higher price and demands cash and a hated seller who quotes a low price and will give three years for payment, the Frenchman will eventually turn to the latter. Anyone who counts upon a refusal by France to trade with Germany if Germany offers much the best terms, is doomed to disillusionment. The Frenchman when the present intense bitterness is over will trade where he can get the best bargain. This is not only true of Frenchmen but of Italians and others, and of course it applies also to other commodities than electric railway equipment.

At the present time Frenchmen find it difficult to trade with anyone. There are high tariff barriers, the law against "export of capital" which prevents the payment of foreign debts except by express permission of the minister of finance; there is the back-breaking depreciation of the franc which means that French buyers have to pay Frs. 6.50 for every dollar's worth and there is the fear of further increase in the balance of trade against the republic.

### SALES MUST BE FINANCED

Frenchmen hear that United States banks will "finance" French purchases here; they will doubtless derive much satisfaction from the speech of Mr. Vanderlip, and the proposal in Congress to form a semi-governmental corporation to "carry" French and other foreign buyers. But up to date about the only terms quoted—actually quoted as distinguished from being talked about in the newspapers—are cash against ship documents, *i.e.*, cash long before delivery on the other side. Within the past week I was interviewing a manufacturer in regard to certain machinery for export to France. Before he went very far into the discussion of what he could supply he wanted to know whether or not a cash credit had been opened here to pay for the goods. If this is to be our idea of "helping France" she will inevitably look elsewhere for help or get along without it.

The conditions call for some tangible plan of which the average buyer can take advantage by which French purchases in this country can be carried here by banks, for it cannot be expected that the manufacturer will extend two or three years credit. Until this is brought about, France must wait for the rehabilitation of her railways—at least so far as we are concerned. That she wants to buy here is certain; we must make it possible for her to do so—or lose the business. There are radical differences in French and American railway standards—notably in the weight of all equipment—but the extent of the business to be done is so great that it would seem to be worth while for American manufacturers to give the French roads what they want.

As a footnote to this subject attention may be called to a report made from Milan by a representative of the Chamber of Commerce of the United States. He says: "There are thousands of bicycles of German manufacture at Chiasso ready to flood the market. There are also carloads of chemicals and dyestuffs which have already been offered Italian merchants at extremely low prices. The high rate of American exchange makes Italian trading with Americans most difficult while the German mark is at its lowest ebb. This makes the price when translated into liri most attractive. The dollar exchange costs the Italians three times as much as the mark exchange. Naturally the prices of German goods in liri are very low."

Transpose lire to franc in this quotation and you have a correct statement of the situation as it applies to France. Nor does this situation affect only bicycles, dyestuffs and chemicals. Germany—defeated Germany—disrupted by Bolshevism and disorganized by war—

this year sold an electric locomotive in Switzerland to the government at a far lower price than was offered by any other country. It would be profitless to characterize this condition of affairs; it speaks for itself in loud tones to the American manufacturer.

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# Buffalo-Niagara Falls High-Speed Line Completes Successful Year

### Frequent Service, High Speed, Attractive Scenery and Comfortable Cars Have Contributed to Attract a Large Patronage

THE high-speed line of the International Railway between Buffalo and Niagara Falls is just rounding out its first year of operation, as it was opened to traffic on June 9, 1918. The line connects Main Street, Buffalo, and Portage Road, Niagara Falls, passing through Tonawanda, North Tonawanda and La Salle. It was described in detail in the issues of the ELECTRIC RAILWAY JOURNAL for July 13 and Aug. 10, 1918. During the year cars have been regularly operated over the line on a thirty-minute headway.

The business which the new line has gathered may be considered all its own, because the old Niagara Falls line of the company, which leaves Buffalo by way of Niagara Street and Military Road, has held up its traffic fairly well. Comparisons are, however, difficult to make because the winter of 1917-1918 was a severe one for the older line, and higher fares were also inaugurated during that season. Comparisons are complicated farther by the fact that the war situation and the steps taken by the government to curtail passenger traffic on the steam roads operated partly to reduce the 1918 summer traffic between Buffalo and Niagara Falls on the new line because the tourist traffic was curtailed. On the other hand, a certain advantage accrued to the new line because the number of steam passenger trains between Buffalo and Niagara Falls was limited. All in all, however, it appears that the new line has developed new business for the company.

The principal factors, of course, in the success of the new line were the high running speed, permitting a running time of one hour between Main and Court Streets, Buffalo, and the Terminal Station at American Falls, Niagara Falls; the frequency of the service; and the wonderful scenic features of the route. The number of stops between terminals was reduced to a minimum, there being a half dozen or less required stops and five signal stops.

Thirty-minute service last summer consisted of two-car trains, which seldom left either terminal city with unfilled seats. As winter came on the operation of two-car trains was confined to the busy periods of the day. W. J. Whiteside, traffic agent of the railway, states that it is planned to operate three-car trains during the coming summer and schedules are being revised accordingly. The general plan is to utilize three-car trains on Sundays, holidays and other days of heavy traffic and two-car trains ordinarily. With three-car trains a twenty-minute schedule is proposed with adequate layover. An alternative under consideration is the operation of two-car trains at intervals of fifteen minutes with a layover of fifteen minutes for the crews at each end.

HIGH-SPEED LINE TRAIN LOADING AT BUFFALO

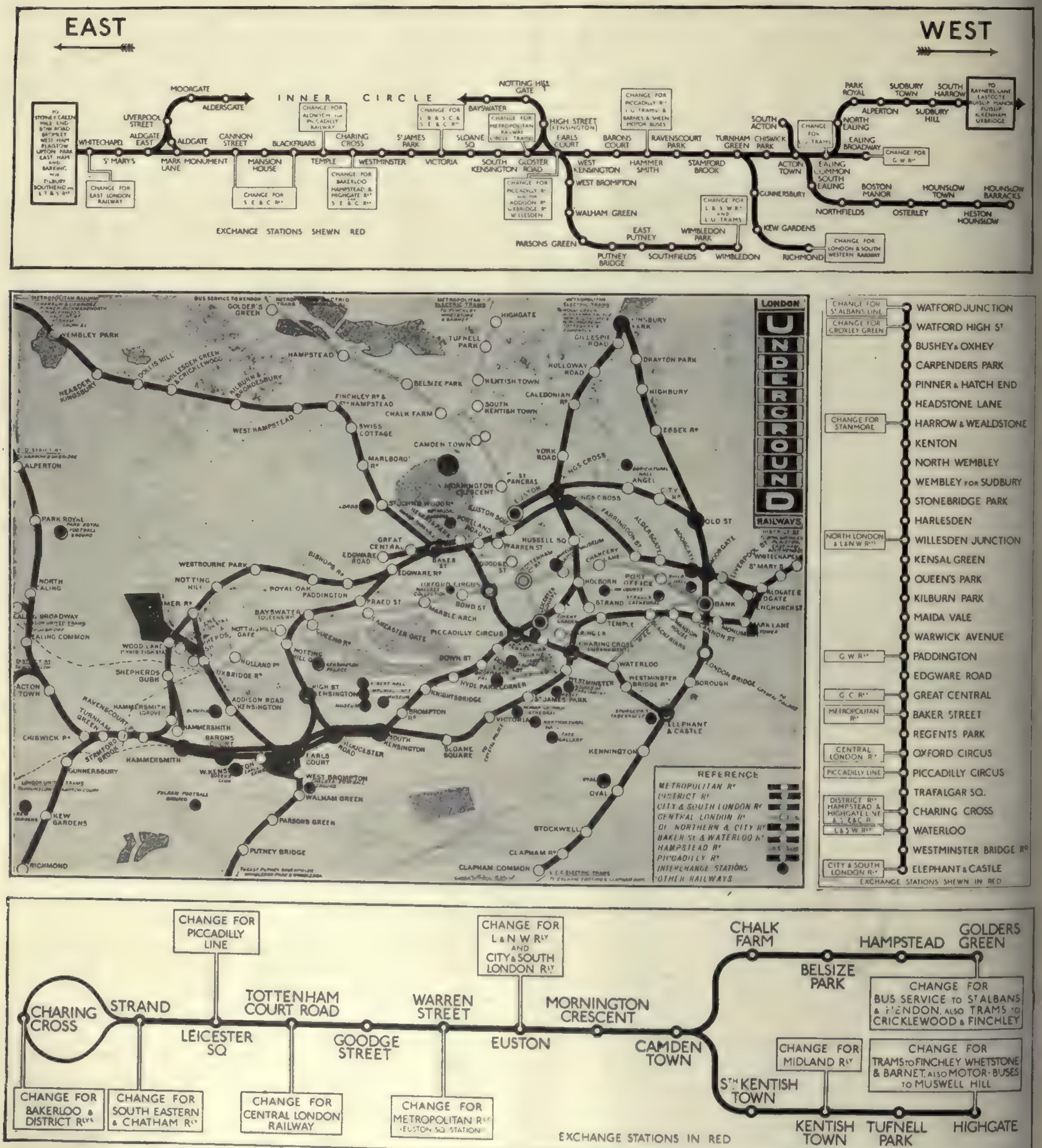
By reference to the preceding articles it will be noted that the new line is 23 miles long, about 4 miles being through Main Street, Buffalo. Between city limits the distance is 17 miles, and the roadbed is on a private right-of-way. To avoid crossings at grades 3½ miles of track was built on an embankment which in places is 26 ft. high. The road curves around the Tonawandas, taking in the outskirts. The rolling stock consists of twenty interurban cars of special type, built by the G. C. Kuhlman Car Company.

# Why London Riders Don't Go Astray Underground

### Maps Showing Routes and Direction of Travel, Enamel Station Signs and Other Directional Publicity Prevent Confusion

COMPARED with the rapid transit systems of other large cities—especially New York with its paralleling north and south lines—that of London looks a hopeless welter of traffic ganglia. Yet it is doubtful whether the stranger in New York or Chicago can get around so readily without asking questions as he can on the London Underground Railways which comprise eight different lines totaling 98.5 miles. It would seem that appreciation of the very complexity of its system made the management determine that it would leave nothing undone for either the out-of-town patron or for the native visiting unfamiliar sections. From the time that the passenger sees the blue-and-white enamel signs that advertise the presence of a station to the moment that he reaches the street again, he is continually reminded of what to do to keep on the right road.

In pre-war days, the entrance to an underground station was the brightest spot in the neighborhood, particularly at night. The old conditions have not yet



SAMPLES OF MAPS BY WHICH THE LONDON UNDERGROUND RAILWAYS GUIDE PATRONS been restored because of the fuel shortage, but there is reason to believe that they will be.

On entering the station, the patron will note a large map like the upper one reproduced; also a smaller map which shows the immediate vicinity of the station. These maps could not be kept up to date during the stress of the war period, but when the abnormal conditions with regard to traffic, high price of paper and printing, etc., let down, these effective means of conveying information will be used as before. The map reproduced is among the first of a new issue. Another shows the route numbers of nearly 150 bus lines in addition to the names of all the underground stations.

Whether or not the patron consults a map he is not likely to buy a ticket to the wrong place. It is enough for him to mention the station to which he wants to go, whereupon he is advised that the cost is so and so, depending upon the distance. On examining his ticket, he will usually find specific directions as to where to transfer in case he is going to another line. Thus a Hampstead passenger desiring to go to some station on the District line is informed that Charing Cross is his transfer station. In some instances several transfers may be necessary.

The purchaser now proceeds to a lift or elevator where the attendant examines and notches his ticket. When the level of the boarding platform is reached, a multiplicity of signs tell him that this is the "Way out" and that that is the way "To trains." Where there are three or more passages, fingerboard posts are used.

As he reaches the train platform, he cannot fail to see the list of stations posted on the wall opposite. If his station is not on the list, he can walk to the other platform where he will find a list of stations covering travel in the other direction. This is not all. An illuminated destination indicator overhead tells him what train is coming next, so that if it is not his train he can step aside to avoid the rush. If perchance he has failed to see this indicator, he is not likely to miss the illuminated destination sign carried at the head of the train itself.

Should he feel nervous about passing his station or getting off the car too soon, he need only look at the diagram maps of station order, two or more of which are tacked up in the roof of the car, four on bulkhead panels and two painted on opposite sides of an illuminated overhead box sign in the center of the car. These signs show the order of stations, red being used to designate those stations where interchange is made with other underground lines or connections afforded to the steam railroads, trams, etc. The two roof signs also have arrows indicating the direction of travel. As the train enters the station, even the bewildering variety of advertising posters will be unable to hide the great red disks, up to 4 ft. or more in diameter, which serve as a background for the blue field and white lettered enameled name of the station.

If, after all these directions, the passenger gets off at the wrong station he will be set aright verbally by the liftman or liftgirl who takes up his ticket.

The foregoing by no means exhausts the efforts of the railway to make riding easy. In peace days, the company issued leaflets by the hundreds of thousands. For instance, there was a monthly pocket circular called "London's Guiding Star," made up of the general map on one side and eight pages on the other. In addition to the list of permanent attractions and steam line connections with the nearest station thereto, similar information was furnished concerning exhibitions and events of the month. One of the eight miniature pages carried a theater district plan of London, showing with the aid of numbers just where these places of amusement were located and the nearest station to each. Publications like this are greatly appreciated.

In spite of such elaborate and painstaking practices to aid the passenger, the management does not feel that perfection has been attained. It is always studying possible improvements and at this very time is figuring on a plan of identifying lines by letters so that ticket and station directions may be simplified—the letter Y, for example, being use to guide passengers destined for the District line, X for the Metropolitan line and so on.

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# Engineers' Unfortunate Experience

### National Service Committee of the Engineering Council Reports Volunteer Officers Cannot Collect Traveling Expenses

ENGINEERS who were enrolled in the Reserve Corps at the beginning of the war will be interested in the circumstances related below as given out by the National Service Committee of the Engineering Council. If other engineers had a similar experience they are urged to send a detailed statement to the office of the committee, McLachlan Building, Washington, D. C. If the experience was common, the combined testimony may be sufficiently strong to induce Congress to provide for reimbursement. It is not probable that corrective action can be secured on the basis of a few instances. Therefore the engineers who have knowledge of similar cases and who fail to respond to this invitation may be depriving other engineers who are not so indifferent as to the consequences.

The following letter was addressed to the American Society of Civil Engineers by one of its associate members resident in the Philippines, and by progressive reference finally came to the Washington office of the Engineering Council.

THE AMERICAN SOCIETY OF CIVIL ENGINEERS,
New York, U. S. A.

DEAR SIRS:

As you are doubtless aware, the American Society during the recent war played a very considerable part in obtaining the services of engineers for the Army. Literature descriptive of the Engineer Officers' Reserve Corps was circulated throughout our membership and the society's appeal for men was probably responsible for a very large number of volunteers. In view of this fact, I am taking the liberty of advising you of certain instances in which the War Department through the Chief of Engineers seems to have violated the agreement under which the engineer officers were induced to offer their services. I am doing this with the hope that the society may be instrumental in securing legislation that will result in a partial reimbursement to the men for some of the financial loss that they suffered through certain rulings of the War Department.

Among other things, we were informed that Reserve Corps officers when ordered to active duty would receive the pay and allowance that officers ordinarily do when changing stations. Any number of Western engineers, several of them located in Alaska, applied for commissions in the First Engineer Reserve Corps. After their applications had gone forward the reserve corps was abolished by the War Department. Without receiving any information to this effect these men were telegraphed offers of commissions in the Engineers, U. S. A. They were accepted and ordered to Camp A. A. Humphreys, Va., for duty as students. Upon their arrival at camp they were informed that they would receive no travel allowances at all. The 7 cents a mile that they expected was not due

> them because they had accepted commissions in the regular army, not in the reserve corps. This was the first intimation that they had as to their new status. Most of the men, particularly those from Alaska, had been to a very considerable expense in traveling, as much as $350 in some cases, and naturally consider themselves unfairly treated.
>
> Another instance, one which covers my own case, occurred as follows: Some twenty-five or thirty of us entered the service in the Philippine Islands. We were discharged in the States, most of us in the eastern part. Our discharges came just too late to catch the December transport for the Philippines so we were forced to wait for the January boat which arrives in Manila about Feb. 15. We were thus more than two months without pay, our army pay having stopped on the date of our discharge and our pay as civilians not beginning until our arrival in the Philippines. Anticipating these conditions, some of the men requested that they be ordered to the Philippines and discharged there or that they be returned to the inactive list in the Reserve Corps so that they could return to their homes with pay. Both of these requests were refused and the men were discharged along with the rest.
>
> Several of us called on various army officials in Washington and were told in every case that new legislation was necessary before we could be reimbursed. It is to acquaint you with these facts and to solicit your assistance in securing the necessary legislation that I am troubling you with this letter.
>
> We all received a letter of appreciation from Major General Black in which we were heartily thanked for the way in which we had responded to our country's call, etc. A little consideration in the orders getting us into and out of the service would have been more to the point.

On May 1 a letter was addressed by the National Service Committee to the Secretary of War in which the above communication was quoted with a request as follows:

> Will you be good enough to inform the Engineering Council through the undersigned whether the facts as related in the letter above quoted are interpreted by the War Department in the same way as by Mr. ——— and whether there is an official intention to present the facts to Congress for the purpose of securing authority to reimburse discharged engineer officers of the Army whose experiences were similar to that above related.

Up to May 24 no response had been received from the War Department but the National Service Committee still has "hopes." While the author of the above letter recites an unfortunate train of circumstances, which seemingly reflects discredit on some one, the committee thinks that judgment should for the time being be tempered with consideration. This war has been so big a thing that the mental capacity of man has been quite inadequate to direct everything rightly. An injustice has been done, but the correction in this case lies not in placing the blame but in securing reparation. Our government is essentially just and the Congress will not advisedly do injury to any man. "Let us have all the facts," says the National Service Committee.

## Keep Inflammable Material Out of the Fill

AN ILLUSTRATION of the importance of care in selecting and inspecting material for fills is furnished by the experience of Newark, N. J., with the embankment installed in conection with the development of Port Newark. A smoldering fire has been burning in the fill for months and members of the fire department of the Submarine Boat Corporation nearby and employees of the city's engineering division on several occasions have attempted without success to extinguish the blaze by playing a hose upon the burning area. The trouble is due to the fact that street sweepings and other organic material form a considerable part of the filling material.

## Fill Up the Empty Seats

### The Philadelphia Rapid Transit Company Urges Its Employees to Develop Salesmanship for Rides

A UNIQUE method was recently used by the Philadelphia Rapid Transit Company for bringing forcibly to the attention of each of its 10,000 employees certain information about the electric railway business of particular interest and importance at this time.

The management feels that too often the "front office" is working so close to the gigantic problems confronting the industry in connection with rates of fare, revenues and expenses, that it is assumed all of the employees throughout the organization are just as well informed and are giving the same serious consideration to these factors, which make for the success or failure of the business.

As a matter of fact, many of the employees have no comprehension of these larger basic matters for the simple reason that no one has taken the trouble to explain the facts to them.

Appreciating the increasing necessity for recognition on the part of electric railway managements of the "merchandising" or "salesmanship" end of the business, President Mitten addressed a letter to all of the employees as follows:

> TO ALL EMPLOYEES:
>
> I desire to thank each of you for the fine spirit of co-operation and loyalty you have shown during the trying conditions brought about by the war.
>
> Continuance of the present high standard of wages during the reconstruction period can be best assured by our all now striving together with renewed effort to accomplish two things:
>
> 1. Build up our "Factory Organization" so as to produce street-car service of the best quality at the lowest cost. In this, all of us—transportation, rolling stock and buildings, electrical, way, and general offices—have important work to do. It means going heart and soul after such things as accident prevention, keeping the cars properly spaced on the streets, careful inspection and cleaning of cars, regularity and economy of power, track betterment, office efficiency, and the elimination of ALL wasted effort.
>
> 2. Improve our "salesmanship" so as to sell more of that which we have for sale—street-car rides. We must sell the empty seats in the off-peak hours to those who now walk or use other transportation. Every person in the territory we serve is a possible car rider. As the common carrier for the entire community, we fall short of doing our full duty to the public if we do not make a car rider of every walker, every automobile user and every steam railroad passenger who can be more conveniently and cheaply carried by street car. You, the conductors and motormen particularly, by your alertness and courtesy, have it within your power to stimulate and encourage the short-ride habit, especially among those who now walk.
>
> The best selling asset in this business is cheerfulness.
>
> A smile will usually win. A grouch always loses.
>
> I invite your thoughtful attention to the enclosed pamphlet by the Hon. William D. B. Ainey, chairman of the Public Service Commission of Pennsylvania.
>
> May 28, 1919. T. E. MITTEN, President.

This letter was printed on the face of an open-end envelope 4¼ in. wide by 6⅞ in. high, and within the envelope was inclosed a pamphlet containing an address by William D. B. Ainey, chairman Public Service Commission of the Commonwealth of Pennsylvania, which was delivered before the public utility group of the United States Chamber of Commerce in St. Louis, and reprinted in the ELECTRIC RAILWAY JOURNAL of May 3, 1919. Chairman Ainey's address emphasized the necessity for better "merchandising" by selling the empty seats, and discussed the effect of rates of fare on the riding.

# Federal Commission Appointed

### President Wilson Chooses Body to Investigate Electric Railway Situation and Recommend General Solution

FEDERAL action looking toward a solution of electric railway problems throughout the country was taken through the creation of the "Federal Electric Railways Commission" by President Wilson. This action was taken pursuant to a recommendation sent to the President on May 15, 1919, by William C. Redfield, Secretary of Commerce, and W. B. Wilson, Secretary of Labor, as noted in this paper for May 24, page 1015.

The President approved this recommendation and appointed the following members, to serve without compensation: Edwin F. Sweet, Assistant Secretary of Commerce; Royal Meeker, Commissioner of Labor Statistics, Department of Labor; Louis B. Wehle, general counsel of the War Finance Corporation, who will act during the absence in Europe of Eugene Meyer, Jr., managing director of the corporation; Charles E. Elmquist, president National Association of Railway and Utilities Commissioners; Charles W. Beall, of the American Investment Bankers' Association; Philip H. Gadsden, American Electric Railway Association, and William D. Mahon, Amalgamated Association of Street and Electric Railway Employees of America. The President has also designated a representative of the American Cities' League of Mayors, but an acceptance has not yet been formally received and an announcement of the mayor who will serve will be made later. The new commission met on June 4 and organized by electing Mr. Elmquist as chairman and Mr. Sweet as vice-chairman.

The commission has no authority to hear and determine specific controversies in any community or in respect of any company. It will attempt to determine the general principles which should govern the regulation, operation and service of electric railways. It will not interfere in any way with the regulatory functions of state regulatory bodies or municipal authorities, its functions being confined to investigation and recommendations. The election of Mr. Elmquist as chairman is the best evidence that it is not the intention of the new commission to interfere in any way with the powers of states or municipalities.

The methods by which the commission hopes to reach its conclusions have not been developed, but will be announced from time to time. "Mr. Elmquist at the conclusion of the meeting said that the commission will not start off with any preconceived notions. It wishes to make its investigation broad and comprehensive with the view to making recommendations which will be a positive contribution to the solution of the problems which now confront the country. Those problems grow out of the expansion and improvement of service which he public properly demands; out of the great increases n the payrolls; out of the high prices for materials; out of controversies which center around financial organiza-ion and methods, and out of franchise relations."

In order to explain to all the regulatory bodies the haracter of the general investigation contemplated, Mr. Elmquist has sent out to all commissioners a copy of he letter to President Wilson from Secretaries Wilson and Redfield [ELECTRIC RAILWAY JOURNAL of May 24, page 1015] with the following comment:

> The President has decided to create a commission to ake a study of the general franchise and operating conditions of the electric railways in their relation to rates, including service-at-cost plans, state and municipal taxation, local paving requirements, and internal economies that may be effected.
>
> During the war, some of the utilities were in favor of having the President take over certain street and electric lines as a war measure and fix their rates, since the government was fixing the price of fuel and labor, and controlling to a large extent the output of the steel mills and other factories. You will recall that the war committee of our association opposed this plan but suggested to the President, in lieu thereof, that he appoint a federal board to make a study of the utility situation and submit its recommendations to the local commissions and municipalities simply for their help and guidance in the determinaton of utility questions.
>
> It was felt for some time that such a board would be created, but final consideration seemed to end with the signing of the armistice. It is reported that the readjustment period has not thus far brought any relief to the utilities and that the condition of many of them is critical. A letter from Secretary Redfield and Secretary Wilson was wired to the President May 15 and resulted in his determination to create a commission. I think it is in the interest of the public that the state commissioners be represented on this board, because the problem is, after all, local in its nature, and all obtainable information should be brought to the board's attention.

## Three Zone System in Detroit

The accompanying diagram shows the method of zone collection used on the Royal Oak suburban division of the Detroit United Railway. Fare boxes are used. The plan followed is an adaptation of the pay-enter pay-leave system, but is somewhat more flexible because of the introduction of what is known as an "identification check." This check, on northbound cars, is given to passengers in zone 1 or the city zone who pay cash fares and request it when they pay their fare. It is not given to passengers who ride on transfers.

On northbound cars, zone 1 is operated in the usual way as pay-enter. Passengers who wish to ride into zone 2 without extra charge and pay their fare in cash ask for an identification check at the time of paying fare as mentioned above. Zones 2, 3 and 4 are operated pay-leave with a 5-cent fare, but a passenger may use the identification check in zone 2 on alighting from the car in place of a cash fare.

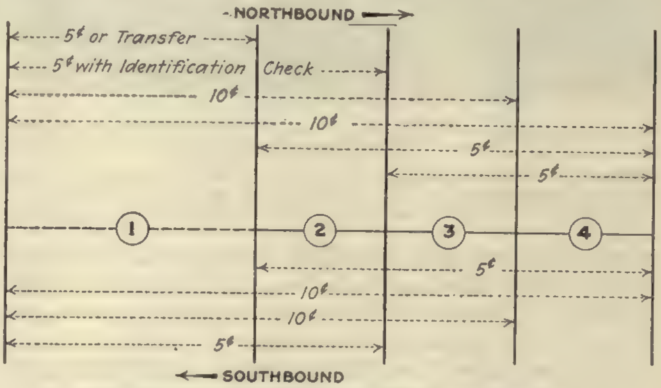


DIAGRAM SHOWING ZONE FARE SYSTEM

On southbound cars, all fares are pay-enter. In zones 4 and 3 a passenger may pay 10 cents and get an identification check or 5 cents and receive no such check. In zone 2 he receives his identification check with his 5-cent fare if he says he is expecting to travel into zone 1. At the entrance to zone 1 an identification check or an additional 5-cent fare is collected from all passengers, and in zone 1 pre-payment collection is made in the usual way. Zones 2, 3 and 4 are about 1 mile in length.

# Cutting Most of the Compromise Out of the Compromise Joint

### Experience of Brooklyn Rapid Transit Company with Experimental Joint Shows It to Be Economical of Material and, to Date, Durable

THE problem of successfully connecting rails of different heights and shapes has had any number of possible solutions, some of which are quite effective. Nevertheless, the compromise joint, as such, continues to give considerable trouble and to cause far greater expense than ordinary joints. Hence any means of reducing costs and bettering the joint conditions should be of interest, particularly when it is remembered that regular compromise joints as furnished with special work will cost from $12 to $15 each.

It is quite safe to assume that many compromise joints are still made up in the field by the blacksmith, using ordinary joint plates found on the job. By far the greater number are used for making connections of parts of special work with tangent tracks and an examination of special-work layouts on almost any system will disclose at least one and generally several of these joints which are defective. The purpose of this article is to explain one plan for reducing joint cost which is being tried out in Brooklyn.

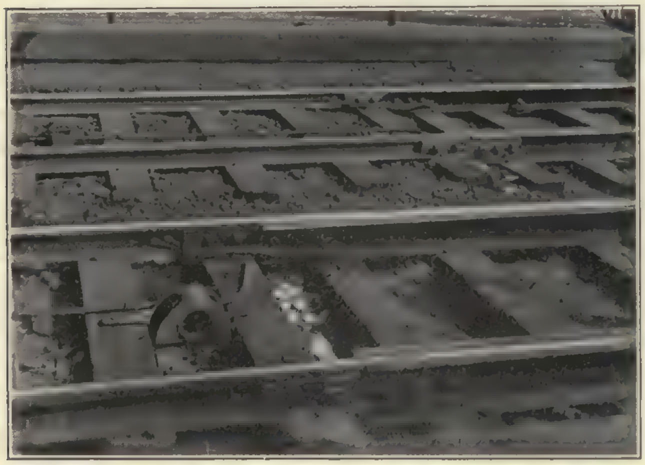


FIG. 1—EXPERIMENTAL "R. P. W." COMPROMISE JOINTS AFTER A YEAR'S SERVICE

These are located at the Brooklyn end of the Williamsburg Bridge, connecting 80-lb. A. S. C. E. and 7-in. 122-lb. association standard groove girder rails. Car traffic more than 3000 per day.

The scheme here illustrated and described was devised by R. P. Williams, formerly inspector of special work for the Brooklyn Rapid Transit System. It is but a short time since the castings were obtained, due to delays from war conditions and for this reason the device is only getting into service, although the experimental joints shown in Fig. 1 have been in use more than a year at the Williamsburg Bridge, where the schedule calls for a traffic of 3000 cars or more per day. It is estimated that the device will result in a saving of from $3 to $5 per joint and that when its use is extended, a total saving of from $1,800 to $3,000 per year should be effected in one particular type of compromise connection alone.

The principal feature of the idea is the means provided for the use of standard splice plates for association standard 7-in., 122-lb. groove girder rail in making connections between 7-in. and 9-in. rails. Similarly the standard angle bar for 5-in., 80-lb. A. S. C. E. rail is to be used in connecting it with 7-in. groove girder rail. This is accomplished by malleable iron base castings, shown in Fig. 2, which are installed upon the upper part of the base of the deeper rail, being held in place by arc welding. The castings are I-shaped, 13 in. long, with webs and flanges about ½ in. thick and reinforcing ribs about 4 in. apart. They weigh about 10 lb. each. The tops of the castings have the same bevel as the upper part of the rail base, thus reproducing the fishing angle at the same level with the lower or shallow rail. Here it may be said that advantage is taken of the fact that this angle is a constant for most rails which are found in Brooklyn.

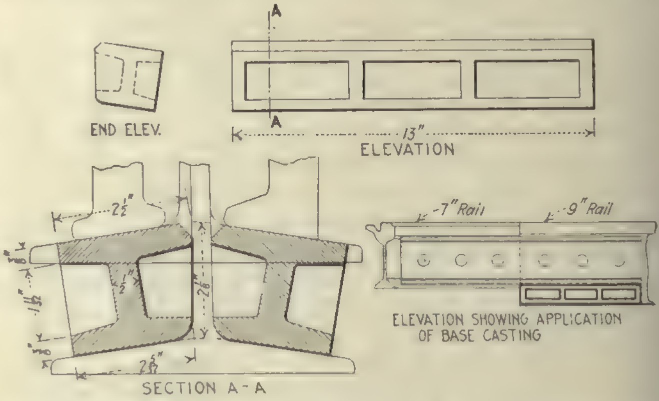


FIG. 2—BASE CASTINGS FOR "R. P. W." COMPROMISE JOINT ASSEMBLED FOR CONNECTING 7-IN. GROOVE GIRDER AND 9-IN. TRAIN GIRDER RAILS

There is occasional trouble in connection with the fishing angle at the top of the joint plate, sometimes due to sectional differences and sometimes due to head wear. This is taken care of by welding a flat shim or liner on top of the joint plate, as indicated in Fig. 3. Of course, the tops of the rail heads are ground to a true surface as soon as the joint is made up. It is also necessary, as of old, to offset the plates at times to line the gage lines of different sections. The base castings are made of a width sufficient to permit the arc welding of the joint plates to them if desired. The cost reduction previously referred to is mainly due to difference in the cost of deep ¾-in. x 8-in. bar steel formerly used for compromise joints when made in the shop, together with the elimination of the waste of steel lost by cutting out the 2-in. vertical step as compared with the cost of ordinary joint plates plus the castings. The experimental joints shown in Fig. 1 are made of bar steel planned to fit 80-lb. A. S C. E. rail, while the bases on the 7-in. rail, in this instance, are made from steel bars cut from joints made up for deeper work which otherwise would have been scrapped. In the experimental joints shown the joint bars are held by ordinary bolts and are also welded to the deep rails and special bases.

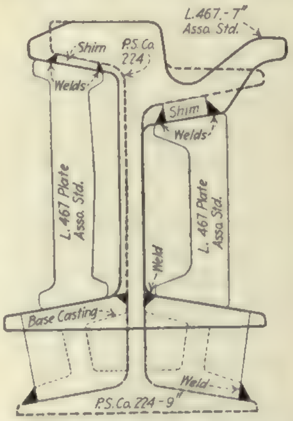


FIG. 3—SHIMS WELDED TO PLATES TO TAKE UP SECTIONAL DIFFERENCE IN FISHING SPACE

## Suggestions for Mechanical Ticket Issue As Applied to a Differential Fares Scheme

BY THEODORE E. THOMAS
London County Council Tramways

THE issue of tickets by mechanical means has always been a more difficult problem for tramways in Great Britain than is the case in America. The chief attraction of the flat fare is the resultant simplification of ticket issue. Most of the tramways undertakings in the London area have, however, now adopted a uniform fares system in place of the more arbitrary system previously in force. Each route is divided into penny stages, each of which is in turn subdivided into sections varying in length (but not in number) according to the incidence of traffic points. The introduction of such a scheme at once suggests the possibility of the issue of tickets by a machine on the platform as passengers board the car. I propose to set out briefly the functions which such a machine should be able to fulfill, with the difficulties to be met, and, if possible, overcome.

The fare for the journey to be taken would be paid to the conductor when the passenger enters the car. Each kind of ticket would be issued from a separate receptacle in which a roll had been placed.

Tickets would be printed to indicate all fare stage points and would be cancelled in the section to which a passenger was entitled to travel.

At each fare stage point the machine would be set so that cancellation at the correct place on the ticket would be automatic.

In the case of return (round-trip) tickets they would only be recorded on issue, and when used for the return journey need only be punched by a cancelling machine.

The machine would record the number of tickets of each variety, thus providing a check upon the record obtained from the starting and finishing numbers on the rolls. Packets of tickets could, if desired, be sold separately and punched by the conductor, with the cancelling machine. In the event of the machine becoming defective a seal would be broken and the tickets removed and punched with the cancelling machine.

Passengers on alighting from the car would be required to hand their tickets to the conductor so that any who had overridden could be excessed.

I can well believe that such a system as has been briefly described sounds complicated and so it is as compared with the simplicity of the flat fare. But the flat fare stands condemned with the great reduction in the value of money caused by the war.

Some of the difficulties that will arise are: (1) Dealing with passengers who lose their tickets. This is not a new problem, as it arises on all railways. (2) At very busy points loading may be unduly delayed. (3) Heavy capital expense. (4) The need for special provision being made for cars not working on their proper routes. (5) Passengers must board and alight from the car at the conductor's platform which is inconvenient at terminals with a heavy traffic in both directions.

The worst side of the story has now been told and it only remains to show what compensating advantages would be obtained.

These are briefly: (1) Every passenger must take a ticket, which is very far from being the case at present. (2) The conductor is always on the platform—a matter of some importance in avoiding delay at stopping oints and reducing the risk of accident. (3) Correct cancellation of tickets is insured. (4) All tickets are collected and available for repulping.

It may be that the writer has not faced all the difficulties, but they must indeed be great if they accumulate to the size of only one objection to the present British practice. I refer to the conductor's struggle to get round to all the passengers on a crowded car. This should be stopped at almost any cost, it tempts honest men and provides a rich harvest for the dishonest.

## Freight Car Repairing Facilities of An Interurban Line

IN THE PROCESS of rearrangement and rehabilitation through which the Decatur yards of the Illinois Traction System are now passing, the facilities for repairing freight cars have been considerably increased. Six tracks with a total capacity of sixty cars have been laid, three on each side of a line of new buildings devoted entirely to the work of maintaining the more than 900 freight cars operated by the company.

At one end of the layout is an office building, 25 ft. x 30 ft. in size, for the inspectors. The next building, of the same width and about 100 ft. long, is a storehouse containing only stock used for the car repairing. In one end of this building is a room in which the men may rest and eat their lunch in cold weather. Each stock bin in the stockroom has a card tacked on the outside, and every piece of material taken out is entered on the card by the storekeeper, who is on duty during all working hours. This procedure is followed not solely to maintain a running inventory but to enable the storekeeper closely to estimate the quantity of each article needed per day and thus keep a plentiful supply on hand.

THREE OF THE SIX FREIGHT CAR REPAIR TRACKS AT THE DECATUR YARDS OF THE I. T. S.

The third building is about 50 ft. long by 25 ft. wide and has a cinder floor. This is to be the freight car repair blacksmith shop and will contain pipe cutter, bolt cutter, drill press, forge, anvil, etc. There is a large rolling door in the center of each side so that the heavy parts of the cars, such as drawbars, bumpers, etc., can be easily handled in the blacksmith shop.

A plank flooring extends along both sides of the entire stretch of buildings and also between them. Beyond the buildings will be stored all lumber and other materials used in the repairing of the cars and not kept in the storeroom. Clear passageways across the tracks are maintained between the main shops and the inspector's office and the storeroom and between the woodworking shop and the lumber pile and blacksmith shop.

## Speedy Erection of Trolley Poles with Gin Poles on Wheels

A RECORD in the rate of setting up trolley poles along the track of the Chicago, Milwaukee & St. Paul Railway has been made by the use of a gin pole built up on a push car and operated along the track. Using this device, poles up to 50 ft. long have been set with a crew of four linemen and about three helpers, including a teamster, the team being used for hoisting the trolley pole and moving the push car from setting to setting. Additional men, of course, were used to line poles and backfill, following the setting crew.

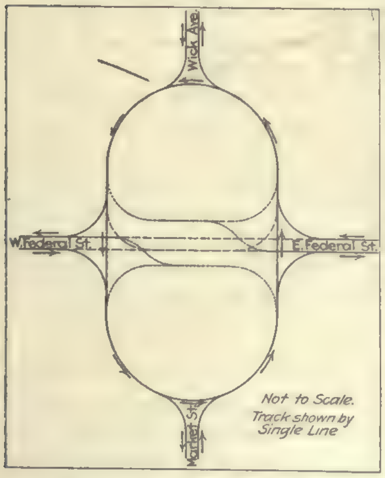
With this rig the rate of progress has been as high as 108 settings per day and has averaged about seventy poles per eight-hour day. Before the portable gin pole was built the average made by the hand method was about fifty poles per day, and this meant hard work on the part of the crew. The gin pole has a total length of about 18 ft. and is slung, about 6 ft. from its lower end, on a horizontal pin supported on a heavy frame built up from an ordinary push car. The gin pole itself is strengthened with longitudinal steel cables passing over central struts so as to form trusses.

The trolley poles are laid with the pickup point immediately over the hole, thus making it possible to place them with a direct lift. The use of this rig avoids the danger of knocking dirt into the hole in course of erection and thereby decreasing the effective depth.

The hoisting equipment consists of a block and tackle slung from the upper end of the gin pole from which the hauling line runs through a snatch block attached to the rail below. The team does the pulling. The gin pole can be easily reversed in its supports for use in setting the poles on the opposite side of the track.

Data for the foregoing were supplied by F. B. Walker, superintendent of electrical construction, Chicago, Milwaukee & St. Paul Railway, Seattle, Wash.

## The "Diamond" Loop at Youngstown



PROPOSED TRACK LAYOUT

IN THE diagram printed in the May 31 issue of this paper, page 1062, in connection with the communication by W. B. Yereance, 128 Broadway, New York City, a "key" was inadvertently omitted from the diagram stating that Mr. Yereance proposed leaving the present track to the extent indicated by the solid lines, adding that shown by the dotted lines and removing that shown by the dash lines. As Mr. Yereance points out in a letter to the editors it would make an unnecessarily complicated layout if the last-named track were not removed. This diagram is reproduced again this week for convenience in reference.

# LETTERS TO THE EDITORS

## Cars Should Carry Passengers, Not Seats

CLEVELAND, OHIO, May 31, 1919.

To the Editors:

Before one despairs too greatly on the electric railway situation I think it would be sensible to give serious consideration to the remedy for high costs and fares with which I have been bombarding railway operators for a long time, namely, abandoning their sacrosanct notion that the first use of a street car is to carry seats instead of passengers. The gain of space that would result from doing away with only a few of the present quota of seats and properly equipping such space for standing passengers would rapidly increase car capacities, as anyone can readily compute.

Under present conditions, the public must largely ride standing in any event, and, at the same time, pay high fares for the privilege. There is little objection or complaint nowadays by the majority of car riders, because they do not get seats; there is great complaint, however, of the cost. My studies indicate that it is entirely practicable to change the space now occupied by seats in a car into standing places in a manner that would abundantly satisfy all conditions. Such plans, in the present emergency, are worthy of close examination on the part of those, at all events, who are inclined to sink back into a hopeless and helpless wonderment as to whether or not the "trolley is in danger of becoming extinct."

GEORGE C. WING.

## Mr. Ford and Light Vehicles

MILAN, ITALY, May 16, 1919.

To the Editors:

The editorial in your issue of April 26, entitled "Mr. Ford's New Car May Be a Wonder, but—" and Mr. Kingsley's very interesting discussion of the matter in the same number prompts me to ask leave to state my humble and European opinion on the matter.

Although there is no possibility of discussion about the relative cost of gasoline and electricity as prime movers of street railway vehicles, I would say that, being an automotive man myself, I have too much respect for Mr. Ford's technical skill to believe that he may involve himself in such a series of blunders as many people seem to think.

Perhaps he may be wrong in believing that he may beat electricity with gasoline, although the last word hasn't been said as yet about economical internal combustion engines, but we mustn't look at him as a gas motor engineer. More than anything else Mr. Ford must be considered as the pioneer in standardized construction of light-weight vehicles, and as such he may solve at least one part of the problem which has already been tackled by Mr. Birney.

Street railways have still to learn a great deal from the automotive field; structural iron, or steel as you Americans are wont to call it, must give way to high strength, steel alloys, while the use of aluminum and its light-weight alloys should be seriously considered for the replacement of a multitude of accessory parts which are now made of copper, brass, etc. The use of hardwood should be restricted to a very few parts by its substitution with stampings of light-weight metals, while cast iron and common iron should absolutely be proscribed from the mechanical and structural part of the ideal car.

Of course, this may be a very difficult goal to attain, but, as a matter of fact, doesn't every real achievement require a deal of time and perserverance?

Mr. Birney has blazed the path with his light-weight one-man car, but being practically a traction man, he had to follow the trend of traction practice, cutting off only such apparent waste as he safely could without breaking the age-long rules of electric railway custom. Mr. Ford, being independent both of the time-worn customs of the railway field and the actual rules of the automobile world, may perhaps achieve something really worth while.

Anyway, in my opinion, it is much better to have the automobile engineers working with the old street cars than against them, and Mr. Ford's move is certainly an indication of a better understanding between the two most important branches of street transportation.

FERDINANDO C. CUSANI.

## Effect of Vibrations on Rail Failures

LOS ANGELES, CAL., May 24, 1919.

To the Editors:

Referring to the editorial comment in your issue of May 10 in which it is stated that rail conditions are responsible for rail breakage near welds and in special work, please be advised that for several years I have observed in both paved and open track that at welds and splice bars deterioration of the rail, if any, is always more pronounced on receiving rail ends in one-way track. From this fact I have reached the conclusion that the problem is for the physicist rather than for the metallurgist.

I have noticed that the less the mass of metal in contact with the rail ends, the less deterioration is evidenced and this would indicate that the theory of vibrations enters into the problem through the presence of vibrations in wheels and rails. An analagous situation prevails in special work which is a problem in itself, but the solution for joints, it would seem, lies in the application of a minimum mass of metal at the rail ends, consistent with track resistance.

W. M. PEGRAM.

## Seatless Cars Tried in Tokyo

THE overcrowding of the electric cars in Tokyo has become so acute as to necessitate taking some measures to increase the capacity of the system. One of the expedients adopted is the seatless car, the greater portion of the seats in these cars having been removed, leaving but a small seating space in the middle. Additional straps have been added to provide support for the passengers. A few of these cars have been put on the main route and the result is being watched eagerly by the promoters of this scheme. It is thought that standing room may perhaps be preferable to no room at all.

Another measure which has been proposed in order to lessen the congestion is to decrease the number of stops and at the same time increase the schedule speed of the car. This latter has not been put into effect as yet as it conflicts with the present police regulations and these must be changed first in order to permit of the trial.

# AMERICAN ASSOCIATION NEWS

## Exhibit Committee Now Assigning Space

CHARLES R. ELLICOTT, Westinghouse Traction Brake Company, chairman American Electric Railway Association exhibit committee, has sent out blank forms for use in filing applications for exhibit space on the "Million Dollar" pier at Atlantic City.

Acting with Mr. Ellicott on this committee are Edwin Besuden, Chicago Varnish Company; Fred C. J. Dell, National Railway Appliance Company; J. J. Dempsey, Brooklyn Rapid Transit Company; Frank H. Gale, General Electric Company; George Keegan, Interborough Rapid Transit Company; J. C. McQuiston, Westinghouse Electric and Manufacturing Company; A. M. Robinson, The J. G. Brill Company; R. T. Senter, Philadelphia Rapid Transit Company; E. B. Smith, American Brake Shoe & Foundry Company.

The committee states that all applications for space received before June 20 will be considered as of that date and will have equal preference as to location.

The general convention committee comprises L. S. Storrs, The Connecticut Company, chairman; Charles R. Ellicott, Westinghouse Traction Brake Company; L. E. Gould, Economy Electric Devices Company; C. L. Henry, Indianapolis & Cincinnati Traction Company; J. J. Stanley, Cleveland Railway; E. P. Waller, General Electric Company; T. W. Wilson, Wilmington & Philadelphia Traction Company.

## Connecticut Section Ends Prosperous Year

WITH the exception of an outing to be held in June the meeting of the Connecticut Company section held at Hartford on May 27 was the last of the season. About 250 men dined together at the Hotel Garde. The membership committee reported an increase in membership from 311 to 339 for May.

The speakers at the meeting were Robt. P. Butler, assistant corporation counsel of Hartford; Harlow C. Clark, New York City; Rev. Joseph Sullivan, Chicopee, Mass., and Charles C. Peirce, Boston, Mass.

Mr. Butler spoke on "Public Servants," and said that while the public of Connecticut has a right to expect much in the way of service from the railway company, the company can rightfully expect much of the people. Dr. Sullivan made and illustrated three points, namely, that the railway man's job is one well worth while, that the prime requisite in doing the job is loyalty, and finally that whole-hearted service is necessary to success.

Mr. Clark impressed upon his hearers the fact that the electric railway is in a bad way, showing by statistics how the financial status has fallen during a few years. He said that the situation will improve but the railways must utilize the car riders as a force in securing a square deal. Mr. Peirce traced the history of electric traction and showed why the railways find themselves in their present straits. They will get out of these through the application of merchandizing principles to their business. He quoted statistics to show that the country is now prosperous, but that there will be a labor shortage soon with no immediate falling in prices. The electric railway will in time share in the general prosperity.

# Recent Happenings in Great Britain

## Labor Program Is Adopted—Increased Fare Movement, Hitherto Mostly Talk, Now Well Under Way

*(From Our Regular Correspondent)*

For the present at least the labor crisis in Great Britain seems to be over. The coal miners and the railwaymen have accepted the terms offered by the government as to shorter hours and improved conditions of employment, and the federation of transport workers has come to an agreement with the employers. Even more important is the fact that a national industrial conference of employers and employed, representing nearly all the great industries of the country, has adopted a series of far-reaching recommendations brought forward by a committee appointed at a previous conference. Among the chief recommendations so adopted are:

A legalized maximum normal working week of forty-eight hours in all industries.

Legalized minimum time rate of wages to be of universal application.

Discouragement of systematic overtime.

Trade conferences to consider how war advances and bonuses should be dealt with.

A full and frank acceptance in trade negotiations of employers' organizations and trade unions.

Organized short time and regulation of government orders and pushing forward of government housing schemes to prevent unemployment.

An adequate provision for the maintenance of the unemployed.

Child labor age to be raised, and more generous provision for sickness and infirmity benefit and old-age pensions.

The establishment of a permanent National Industrial Council of employers and workers to advise the government on national industrial questions.

It is perhaps significant of the differences between the British national temperament and that of European continental countries that on May Day, when Socialist demonstrations were producing riots in Paris and when half of Europe was—as it still is—plunged in anarchy, a further peaceful meeting of the provisional joint committee of the British National Industrial Conference was held in London at which a guarantee was received from the government to pass the legislation necessary to carry the above recommendations into effect. The undertaking was contained in a letter from Lloyd George, the Prime Minister, to the joint committee, and it was read by Sir Robert Horne, the Minister of Labor.

### THE NEW INDUSTRIAL DAY

In this letter the Prime Minister said that foreign countries were looking to Great Britain to give them a lead in the foundation of a new and better industrial order, and the report of the committee marked the beginning of such a foundation. He fully accepted the principle of maximum hours and minimum wages. For the purpose of the former a bill was being drafted, and it would provide elasticity to meet the circumstances of particular industries. As regards wages, the question of the best method was complex and full of difficulties, and the government would in the first place set up a commission to report on the whole matter. He hoped that the National Industrial Council would speedily address itself to the important question of unemployment. The council after hearing the letter adjourned to permit all the subjects to be further considered by representatives of employers and trade unions.

Never before has anything of the nature of a national agreement on such subjects been brought about, and hopes for the industrial future are correspondingly bright. It was stated in Commons, shortly before the Easter adjournment, that Whitley joint industrial councils for all the leading industries except four have now been constituted.

In the domain of tramways, it will be remembered that such a joint industrial council has recently been constituted, and that a forty-eight-hour working week has been agreed to. The shorter week is now coming into operation on the tramway undertakings throughout the country, though the new organization can hardly be completed until all or nearly all the employees who were serving in the forces have been got back. Estimates have been issued by many of the tramway authorities of the increased working expenses which will be involved.

### INCREASE IN FARES NECESSARY

The only way to meet the increase is with further increases of fares. Such increases are now being made where the existing fares are not already up to the statutory maxima. Where the point has already been reached, application is being made to the Board of Trade for authority to make further increases. That arrangement, however, is likely to be only a temporary one, and there may be further legislation of a more permanent kind, as it is clear enough that working expenses will not materially fall for a long time. In any event, the tramway authorities at present have easier and cheaper machinery for getting increases of fares than that which seems to be open to the electric railway companies of America. We do not hear of receivers being appointed to any great extent on the company undertakings, while the municipal railways always have the rates to fall back upon in case of a deficit.

### LONDON FARES GO UP

In order to meet additional expenditures, a further increase in fares on the London County Council Tramways came into force in the end of April. The average distance for which the passenger is carried for a penny is reduced from 1.8 mile to 1.5, with a single overlap in place of the present double overlap. Each route is divided into sections, of an average length of 0.75 mile, two consecutive sections to be traversed for 1d., four for 2d., six for 3d. and eight or more for 4d. The new workmen's fares are 2d. for a return journey over a stage of 2 miles (total journey 4 miles), 3d. for a return journey over a stage of 3 miles (total 6 miles), 4d. for a return journey over 4 miles (total 8 miles), and a 5d. ticket for a total journey above 8 miles, with transfer facilities.

It is estimated that, under the new scale, the loss on workmen's cars will be reduced from £160,000 to £105,000 a year, and that £40,000 a year will be forthcoming as the result of improved collection consequent on greater efficiency resulting from the reduction in hours. The total increased revenue is estimated at £416,000.

### GLASGOW ABOUT TO SUCCUMB

Even in Glasgow, where the entire capital cost of the municipal tramway undertaking has been repaid out of receipts, so that there are no interest or sinking fund charges, the necessity of increasing fares is becoming urgent. Glasgow is probably the only place in the country where the halfpenny fare has not yet been abolished. At a meeting of the finance sub-committee of the tramways committee on April 30, it was decided by the casting vote of the chairman to recommend the abolition of the halfpenny fare, the minimum to be 1d., rising by stages of ½d. according to distance to a maximum of 3d.

This decision as regards Glasgow was reached after full consideration of a report by James Dalrymple, the general manager. In this Mr. Dalrymple stated that it was absolutely necessary to increase the revenue in order to meet the increase in wages and the high cost of materials. Regarding a suggestion that an increase in revenue should be obtained by a further reduction in fares, he pointed out that the department could not possibly, with the present plant, carry any more passengers.

### WAGES CLIMBING IN GLASGOW

During the past few months the average number of passengers per car-mile in Glasgow had reached twenty. Were it not for the overcrowding, the financial position of the department would be hopeless. With an average revenue per passenger of about ⅝d., it was impossible to make ends meet. For the year ending May 31, the estimated revenue was £1,521,215 and the expenditure £1,474,800, giving a surplus of only £46,415. The amount set aside for depreciation, £124,000, which was the same as for the previous year, was now quite inadequate owing to the great increase in wages and cost of materials. The wages bill for the year 1913-14 was £441,048, last year it was £649,749, for the current year it was estimated at £830,000, and for next year at £950,000. Mr. Dalrymple estimated the revenue for next year at £1,571,000, and the expenditure at £1,736,560 (including £245,000 for depreciation and renewals), showing a deficit of £165,560. He recommended the increase of fares which the sub-committee adopted. It involves an increase of ½d. on each hitherto existing fare.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## San Francisco M. O. Review

### Having Embarked on Municipal Ownership San Francisco Must Needs Carry Out Its Work

The annual report of M. M. O'Shaughnessy, city engineer of San Francisco, Cal., for the year 1917-1918, submitted to the Board of Public Works at San Francisco under date of Jan. 2, 1919, contains a general review of the San Francisco Municipal Railway and the problems confronting the building and operation of that system.

#### WANTS CITY'S RIGHTS STRENGTHENED

Mr. O'Shaughnessy says that, while the municipal charter has been instrumental in fostering the promotion and growth of the municipal railway system, it has been seriously defective in that it has prevented rapid transit service being given to new and outlying districts which were naturally tributary only to privately-owned systems and which could not be properly reached by extensions from the municipal system.

According to Mr. O'Shaughnessy there are several causes tending to limit the extension of the municipal system. The city has a limit of bonded indebtedness of 15 per cent of its assessed valuation. At the present time the city, with projects to which it is committed, has almost exhausted this limit and there are yet other urgent purposes for which bonds must be issued in the near future. He says that the difficulty could be eliminated by an amendment to the charter which would reduce the limit of bonded indebtedness to 8 per cent for non-earning projects but which would remove all limit of bonds which might be issued for self-sustaining public utilities. This would put the city in the same position as a private concern desiring to raise money for the construction of such properties.

Since the completion of the work contemplated in the original bond issue the only extensions that have been built have been from earnings. With the natural tendency to a rising wage scale, it is safe to assume that future earnings on a 5-cent fare will be adequate only for wages, maintenance and renewals, bond interest and bond retirement.

#### PLEA FOR UNIFIED MANAGEMENT

Mr. O'Shaughnessy says that under unified management it would be possible to eliminate a great deal of unnecessary service, particularly where the privately-owned and the municipal systems operate along parallel routes. According to him, the necessity for the city acquiring the United Railroads is extremely urgent. This, he says, is appreciated even by those who are opposed on general principles to municipal ownership. As the time approaches for the expiration of the franchises of the United Railroads the necessity of the city taking over the lines will become more urgent and more apparent.

According to Mr. O'Shaughnessy, as long as the present conditions limiting bonded indebtedness exist it will probably be impossible for the city to issue bonds to cover the entire purchase price of the United Railroads. He feels, however, that if the bonds were issued to buy the property at a fair price the interest on the bonds could be paid out of the earnings of the system and a sinking fund created which would free the entire property of encumbrance within twenty-five or thirty years and at the same time provide for reasonable extensions to the system.

#### THE CITY'S ACCOMPLISHMENT

Mr. O'Shaughnessy points out that what the municipal railways have done is best realized when it is observed that, while the city has constructed and acquired some 48.94 miles of track in the 1910 and 1913 bond issues, it has constructed 10.16 miles out of the surplus earnings of the road, and in addition to this has paid the interest on the bonds, set aside $923,456 in its depreciation reserve, $35,339 in its injury insurance fund, and has retired $303,000 of its bonds.

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## Improvements Planned for Seattle

An ordinance recently passed by the City Council of Seattle, Wash., and sent to Acting Mayor Lane for approval, provides for the issuance and sale of $790,000 of utility bonds for extensions and betterments to the Municipal Railway. A bill has also been introduced in the City Council, at the request of the city utilities department, providing for a loan from the city railway fund to the Municipal Railway betterment fund of 1919, to cover the cost of several immediate improvements which Thomas F. Murphine, superintendent of public utilities, recommends.

The first work proposed by Mr. Murphine is the construction of a double-track line on Third Avenue, from Stewart Street to the south margin of Pine Street; connections of the tracks at the south end of the Ballard bridge and the connection of tracks of Division A and the Fremont-Ballard lines at Twenty-fourth Avenue, N. W., and West Sixty-seventh Street; extension of Division A at Fremont Avenue to the Fremont Avenue bridge. The improvements are estimated to cost $49,650.

## Buffalo Arbitration Stops

### Governor's Veto of Service-at-Cost Responsible—Railway Officials Are Still Hopeful

The City Council of Buffalo, N. Y., has voted to discontinue the arbitration proceedings started some time ago to fix the valuation of the properties of the International Railway within the city to be used as the basis of a service-at-cost agreement with the company and also determine upon a rate to be allowed the company as a return upon the investment fixed by the arbiters. This step was taken as the result of Governor Smith's veto of the service-at-cost bill which was passed by the Legislature and which had the approval of the Mayor.

#### STATEMENT OF COMPANY

The current issue of the *Service Spot Light*, the official organ of the railway, says:

> The International Railway is disappointed at Governor Smith's veto of the act enabling the city and the company to get together on some service-at-cost plan, just and equitable to all concerned. We had hoped for better treatment. Governor Smith may be right from his standpoint, but it is difficult to convince the people that they haven't the right to enter into an agreement on a matter that concerns them and them alone. But we aren't crushed.
>
> We still hold firmly to the belief that some way will be worked out to your satisfaction and to ours. We are maintaining a war scale of wages—a wage higher than it ever seemed possible for us to pay. We have paid a greatly increased rate for supplies and materials. We counted greatly on the institution of the service-at-cost plan to restore us to a satisfactory equilibrium. Out of the present confusion may come the real solution.

In the same issue of the *Service Spot Light*, the railway calls attention to the case in the State Court of Appeals in which the company asks that court to uphold the contention of the Appellate Division in the right of the Public Service Commission to fix fares in muncipipalities even though the fares are limited by local franchises. One section of the company's franchise says:

> Nothing in this contract shall be construed to prevent the Legislature from regulating the fares of said companies, or either of them.

Officers of the railway contend that this clause allows the Public Service Commission to determine the reasonableness of fares charged by the International Railway and fix an adequate rate.

The sale of the company's properties in Buffalo to satisfy a lien for unpaid taxes was prevented on May 26 by the payment of $71,000 in back taxes by the company to the city. The balance of the $350,000 in taxes will be paid in installments.

# Wages and Fares Considered

## General Discussion of Detroit's Problems Diverted by Demands of Men for Wage Increases

The meeting of Detroit's Mayor and Council and Detroit United Railway officials on May 23 was scheduled to discuss final arrangements for extensions, and plans for rerouting lines in the congested sections. These matters, however, received second consideration due to the fact that the railway employees had issued an ultimatum to the company asking practically a 50 per cent increase in wages and backed up their demands by threatening a strike. The men who are now paid 43, 46 and 48 cents an hour, varying with the length of service, are asking 65, 70 and 75 cents an hour. The company has requested the union to withdraw its objection to the employment of women. This request was vetoed by the union.

### COMPANY STATES ITS ATTITUDE

The stand taken by the company was not that the demands of the men were unjust, but that the money to provide for the increase in wages would have to be provided by an increase in fares. Prior to the meeting Mayor Couzens stated that he considered the railways would have to have a higher rate of fare if the men were to have their wages properly increased, but he did not state what he considered a fair increase. He also said the company must state its financial needs and allow the city time to verify the figures, all of which was promised by President Brooks at the meeting of the company on May 9.

The Mayor scored the officials of the company for waiting until two or three days prior to the threatened strike before submitting figures and requesting higher fares. The first figures presented by E. J. Burdick, the company's assistant general manager, were unsatisfactory to the Mayor, in that they were based on assumptions which the Mayor would not admit. It was shown by these figures that the company faces an alleged deficit of $1,074,383 for the present year, under present conditions without making provision for the increase in wages demanded by the employees. It was stated by Mr. Burdick that the estimated deficit for 1919 was based upon figures for the first three months of the year.

### COUNCIL DIVIDED ON FARES

The Council was divided on the question of fare boost. Some members admitted that they would consider a change of rates if it could be shown by the company that higher wages could not be granted the men without the increase. Councilman John A. Kronk, author of the Kronk 5-cent fare ordinance, stated that service and sensible routing of the cars were in his opinion more essential than an argument about the rate of fare.

The Twelfth Street extension and St. Jean Avenue extension were discussed and it was agreed that they should be built at once and that the rate of fare should be the same as now exists on other of the city's non-franchise lines. All propositions of the company relative to rerouting downtown cars were tabled for future consideration. The meeting was adjourned and the conferees met again on May 26.

The threatened strike was postponed by the men at a later meeting for two weeks, to give the Council time to act, after the Mayor had assured representatives of the union that he and the Council were endeavoring to reach an honest agreement with the company.

The Council has ordered an exhaustive audit of the accounts of the railway in order to determine if the increase in wages could be granted the men. City Comptroller George Engel was asked to report immediately on the length of time needed to complete the survey. If his estimate of one week proves correct the Council will have that length of time to consider the question and decide a just rate of fare which will enable the company to operate without deficit and pay the increased rate of wages to its employees.

### AUDIT STARTED

The audit of the Detroit United Railway's accounts to determine the possibility of its paying wage increases on the present rate of fares, begun by the city on May 27, was practically completed by June 2, and it was expected that the matter would be acted upon by the Council on June 3.

A meeting of the railway employees is set for June 7. The men have announced a strike will be voted then unless they receive some definite assurance of being granted higher wages.

Accountants from the offices of Barclay Parsons & Clapp, Marwick-Mitchell-Peat Company, the Detroit Bureau of Government Research, as well as from his own office, are working under the direction of George Engel, city comptroller.

The results of the audit tend to verify the statement of the railway officials to the effect that a deficit of $675,000 for the year 1919 would result if the company continued to operate at present fares and wages.

The Board of Street Railway Commissioners, realizing that the settlement of the wage question now at hand will not dispose of the problem which has confronted public officials of Detroit for years, and that conditions now are intolerable and daily growing worse, express belief that the efforts of the city officials should be redoubled to the end that some plan may be evolved which will grant relief to the community.

It is set forth by the commission that the defeat of the two former municipal proposals by the voters of Detroit is in no sense a rejection of the municipal ownership principle, but rather a disapproval of the form of acquisition. It is also stated that since the election of April 7, numerous and conflicting suggestions have been offered by citizens, each of whom expressed a belief that his proposal was the proper one for the adjustment of present difficulties. They are principally: Municipal ownership by a revised purchase agreement plan; municipal ownership by the condemnation plan; municipal ownership by piecemeal construction; private ownership with municipal control under a settlement similiar to the Cleveland so-called service-at-cost plan; municipal ownership of a rapid transit system of subways and elevated railways.

The commissioners state that the board is not in a position to know positively which proposal best suits conditions, but they believe that a pole of public sentiment could be taken at a nominal cost which would enable the city authorities to proceed with some plan that they would know would have a reasonable chance of securing adoption when submitted at an election.

The Council approved the appropriation of $10,000 for conducting a postcard canvas of opinions of voters to decide what action the city should take. The questions to be asked are:

1. Do you wish the administration to proceed with plans leading to the acquisition by the city of the street railway system? If so, which of these plans do you prefer? (a) Acquisition of the surface lines by purchase. (b) Acquisition of the surface lines by condemnation. (c) Acquisition of a partial surface system by piecemeal construction.

2. Do you favor an agreement with the Detroit United Railway for a five or ten-year period, similar to the Cleveland plan, calling for municipal control of privately-owned surface lines?

3. Do you favor the preparation of plans for the acquisition of a rapid transit system to consist of subways and elevated railways, independent of whatever action may be taken with regard to the surface lines?

In the opinion of the board it is obvious that such a questionnaire plan will enable the voters, both men and women, to discuss the issue in their homes before indicating a preference, and an expression will be obtained without the inconvenience of going to a polling booth.

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## Strike in Muskogee

All conductors and motormen employed by the Muskogee (Okla.) Traction Company went on strike at midnight of May 29 and the city has been without railway service since that date. R. D. Long, general manager, made no attempt to operate the lines when the men quit. The strike is the result of the refusal of the company to grant demands for a sliding wage scale of 44 cents to 50 cents an hour. The present scale is 24 cents to 30 cents an hour. The company offered a compromise of 30 cents to 41 cents an hour. There has been no trouble of any kind. One-man cars are operated in Muskogee. About 100 men are involved in the strike.

## Scranton Wage Award Announced

P. F. Calpin and John B. O'Malley, who represented the men on the arbitration board that heard the arguments on wages for employees of the Scranton (Pa.) Railway, have received the award made by Chairman Charlton Ogburn, representative of the War Labor Board, and refused to sign it. The award did not grant any increase n wages to the conductors and motornen, except for overtime, allowing them time and a half for overtime, instead of time and a quarter. Attorney H. C. Reynolds and W. L. Connell, representing the railway on the arbitraion board, affixed their signatures to he award.

The carhousemen and shopmen of he company are to have an eight-hour ay with the same daily wage that they re now receiving for ten hours of vork. The trackmen are to have a ine-hour day with the same daily wage s they are now receiving for ten ours of labor. Mechanics in various nes employed by the company are to eceive slight increases.

The following table shows the rate f wages per hour asked by all of the ren and the amount that has been ranted them by Charlton Ogburn, repesentative of the War Labor Board nd chairman of the arbitration board:

| | Rate Awarded | Rate Demanded |
|---|---|---|
| Conductors and Motormen: | | |
| rst three months | $0.41 | $0.58 |
| ext nine months | .43 | .59 |
| cond year | .45 | .60 |
| Third year and after the men asked same as second-ar men and got 45 cents an hour, same as second ar. | | |
| ackmen | $0.42½ | $0.57 |
| olley tenders | .42½ | .57 |
| ack foremen | .49 | .64 |
| amsters | .45 | .57 |
| acksmiths | .518 | .71 |
| ill pressmen | .467 | .68 |
| men | .442 | .68 |
| r cleaners | .42½ | .57 |
| remen | .46.4 | .62 |
| ers | .42½ | .57 |
| men helpers | .42½ | .68 |
| inters | .46.4 | .68 |

## Unions at Odds

The strike of the platform employees the Rochester & Syracuse Railroad, chester, N. Y., referred to in the LECTRIC RAILWAY JOURNAL for May , page 1066, was settled on May 23. e men were out more than a week. th the Amalgamated Association and e Brotherhood of Locomotive Engiers were involved. As a result of the ttlement Brotherhood members have urned to their jobs as members of Amalgamated Association.

The issue involved was clean cut. e Amalgamated refused to agree to operation of cars over the local chester lines by Brotherhood men. e interurban men went on strike her than abandon their Brotherhood liation. The Amalgamated thereupn agreed to furnish men to operate interurban. The strike settlement been explained as follows:

> he men return to their former jobs with r seniority and without prejudice, and one has made application to the Amalated Association for membership. The l determination of the question will be submitted to the American Federation of Labor for solution.
>
> The Brotherhood never has been affiliated with the American Federation of Labor, while the Amalgamated has. At the last convention of the Brotherhood a request for affiliation was formulated. It is expected that favorable action will be taken in June.
>
> The Amalgamated has claimed that the Brotherhood has no rights on electric railroads. The Brotherhood defends its rights on the ground that railroads are rapidly becoming electrified throughout the country. The counter proposition that Amalgamated men had no right to operate cars over steam roads was brought up during the strike just settled.
>
> This is the question, then, that is to be solved by the American Federation of Labor, presumably at its June convention.

## Railway Plans Bus Service

In connection with the proposed motor bus service asked for by the Connecticut Valley Street Railway, Greenfield, Mass., it is the intention of the company, if its petitions are acted on favorably by the Public Service Commission, to start motor bus service between the railroad station in Greenfield and terminals in Turners Falls, at the head of the thoroughfare known as Avenue A.

This proposed new service will be in addition to and will supplement the company's present car service. The rate of fare on the buses will correspond with the rate at present in effect on the cars of the railway, a minimum fare of 6 cents with a rate of 3 cents per mile. The company looks forward to this service as a means of preserving to the railway its legitimate business between these two points.

## Spokane Men Want to Organize

To have the Washington Water Power Company, Spokane, Wash., grant its trainmen permission to join a union, a delegation from the central labor council conferred recently with D. L. Huntington, president, and W. E. Coman, vice-president and general manager of the power company. Mr. Huntington said he did not care to have his men organize.

In a statement made for publication, Mr. Huntington said in part:

> A committee composed of representatives of several unions called upon me to ascertain the attitude of the company regarding unionizing the trainmen. I told them that our relations with our employees are excellent and that we could see no reason to change our well-known policy in these matters. Our methods of handling directly with our own employees all questions regarding our relations with them have been entirely successful and satisfactory, both to the employees and to the company. Contrary to the statement in an evening paper, the question of unionizing is not being brought up by our own employees.

The committee that called on the officers of the company was composed of Everett J. Parker, president of the trainmen's union; D. P. Reid, representing the electrical workers; Fred W. Green, president of the musicians' union; James McGowan of the steam engineers, and Robert Cullen of the culinary workers. This committee is regarded in labor circles as fully representative of the original trade of Spokane.

## Wage Payment Made

The employees of the Rhode Island Company, Providence, R. I., whose wages were increased last October by award of the War Labor Board, the decree being retroactive to July 1, have been paid the back wages due them, a total of $155,000 being disbursed among 3600 employees.

The Rhode Island Company was unable to pay the amount in a lump sum as ordered by the War Labor Board and a subsequent decree directed the company to make the payments in three installments. The first payment was made on time, but the second payment was allowed to lapse and before the date due for the third payment the company went into the hands of a receiver.

Permanent receivers were later appointed and they applied to the Superior Court for authority to make the payment. This authority was at first refused, but the carmen's union took the matter up and when the employees voted to strike the court authorized the receivers to make the payment. Under the law thirty days was allowed in which appeals from the ruling of the court could be taken and the receivers were obliged to await the expiration of that period before distributing the money. The time expired on May 24, and on that date the employees received the money due them.

## Preparing for Pittsburgh Wage Hearings

Hearings of the electric railway wage controversy at Pittsburgh, Pa., will open before Charlton Ogburn, public utilities representative of the War Labor Board, in Pittsburgh on June 16. Mr. Ogburn will hear testimony from the receivers and the men to establish the points of fact in the differences that led to a four-day strike, beginning on May 14.

After Mr. Ogburn has briefed the testimony offered before him in Pittsburgh and sent it to the War Labor Board, that body will announce a date for hearing arguments of counsel before William Howard Taft and Basil Manley, joint chairmen of the board, in Washington.

The question at issue before the board is purely one of wages. The men demand a 12-cent increase over the present schedule of 43, 46 and 48 cents an hour. Questions of operating conditions, which the receivers sought to raise early in the controversy, were dropped upon the insistence of union officials at the conference at which the agreement to submit the matter to the Labor Board was entered into. It was this agreement that ended the strike. The receivers had hoped to get better "tripper and trailer" conditions in return for some wage concession, but the men would have none of this.

As it stands the proceedings before the Labor Board do not amount to arbitration, strictly speaking. Neither side is definitely bound to accept the award. The United States Court firmly refused to enter into binding arbitration, holding that such would be illegal delegation of part of its authority. So the men have retained the right to strike again if the court rejects an award in their favor or fails to act upon the award within twenty days after it is made.

## St. Louis Loop Development Urged

John D. Knapp, a member of the free bridge committee of the Tenth Ward Improvement Association of St. Louis, Mo., has reported to the president of that association and the members of the free bridge committee in regard to the plan initiated by the association for a city-wide campaign for finishing the St. Louis Free Bridge and for new interurban and steam terminal business via the bridge.

Mr. Knapp says that the city government is now busily engaged in stringing wires for street car and interurban service and that work has commenced on the construction of the loop at the western end of the bridge approach. He recommends to the association a number of steps to be taken by the city properly to finish the loop on both sides of the river.

He suggests the condemnation in St. Louis of an entire block as a site for the loop. He also recommends the construction of a loop in East St. Louis sufficiently large for the municipal railway which will operate over the bridge and for a spur connection to permit the East St. Louis lines to operate over the loop.

## Preparing for Wheeling Arbitration

Following several conferences at Charleston, W. Va., between the various traction officials and the representatives of the railway workers relative to the new wage scale, it is reported that the demands of the linemen, engineers and firemen will be taken up first by the arbitration committee.

It was also announced that C. R. Parrs, Huntington, an official of the Ohio Valley Traction Company, would represent the companies involved as a member of the arbitration committee. W. Roy, an official of the eastern Ohio district miners' nuion, will be the umpire.

Arbitration was decided upon following a strike at Wheeling on May 1, when all lines in the entire Wheeling district and in this section of eastern Ohio were tied up and all power plant employees affiliated with the unions ceased work.

It is reported that it is practically agreed upon by the traction officials and representatives of the carmen's union that the firemen's, engineers' and linemen's compromised advanced wage scale will be arranged without any difficulty, but that it will not prove so easy to dispose of the platform men's scale. The number of platform men involved is about 600.

## Boston Wages Negotiations Under Way

Conferences were begun during the week ended May 31 between the management of the Boston (Mass.) Elevated Railway and representatives of the employees' union relative to the formulation of a new wage scale to take the place of the agreement which expired on May 1, after a term of three years. No official statement has been made as yet regarding the subject matter of the conferences, but it is understood that a demand for a maximum wage of 73 cents an hour was set forth by the union early in the meetings, and that in a nutshell the employees are now seeking an eight-hour day on the basis of nine hours' pay.

The present maximum wage is 48 cents an hour. Under the existing 8-cent fare the company's operations showed a deficit of $316,392 for April, compared with deficits of $224,920 in March, $285,124 in February, and $219,269 in January. Total receipts in April were $2,386,822, and the cost of service per passenger was 9.328 cents. Receipts under the 8-cent fare in April, 1919, showed an increase of $727,170 or 45.96 per cent compared with April, 1918, under the old 5-cent fare.

It seems probable that the company will be obliged to institute a 10-cent fare later in the season unless plans for the trial of a zone system are put into effect, although no official statement to this effect has as yet been forthcoming. The size of the April, 1919, deficit was in large measure due to excess of track and car repair work above a fair monthly average.

## Would Continue National Employment Service

Secretary of Labor Wilson has recommended to Congress the enactment of legislation creating a permanent public employment service for the United States and has transmitted an outline of a bill which calls for the continuance of the United States Employment Service, developed during the war, as a permanent bureau in the Department of Labor and in charge of a director general appointed by the President, and a system of public employment offices, operated by the states and co-operating with the Federal Employment Service. The federal government would contribute funds to the states for the maintenance of their offices, which would work under standard rules and regulations prescribed by the United States Employment Service, the national service handling labor clearances between states, inspecting and gathering of information as to labor and employment conditions. At the conference which agreed upon this outline were representatives of thirty states, including nearly all the industrial states, and representatives of employers and labor.

# News Notes

**Increase in Wages Granted.**—The Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, has decided to increase the wages of its men 5 cents an hour, dating from May 1. The men had asked back pay from Aug. 16, 1918. A conference will be held within a few days to discuss this matter.

**Wage Increase in Fargo, N. D.**—Five cents an hour for all trainmen and other employees of the Fargo and Moorehead division of the Northern States Power Company is an advance already effective. The increase affects about fifty men and will mean an addition of $7,000 to the payroll for the year.

**Examination for Special Work Inspector.**—The Civil Service Commission of New York State will shortly conduct an examination for an inspector of special track work installation for the Public Service Commission for the First District. The salary is from $1,501 to $1,800. Five years' experience is required. The position is open to nonresidents.

**Wage Increase in East Liverpool.**—A new wage scale, ranging from 43 to 47 cents an hour has been awarded the platform employees of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, by a board of arbitration which has been considering the demands of the men for several weeks. This is an increase of 11 per cent over the 1918 scale.

**Trial Put Over to November.**—The trial of Bruce Cameron, superintendent of the United Railways, St. Louis, Mo., on charges made in connection with the disappearance of petitions for a referendum on the so-called "Compromise United Railway Ordinance" has been deferred until the November term of court by Judge Dearing of the Reynolds County Circuit Court at Centerville, Mo.

**Believes Municipal Ownership Plan Unconstitutional.** — Senator J. Turner Butler believes the bill which has passed the House requiring the County Commissioners of Duval County, Florida, to build an electric interurban railway to Pablo and Atlantic Beach from the profits of the municipally owned electric light and water plants of Jacksonville, is unconstitutional, and he will not pass the measure through the Senate.

**Auto Bill Fails.**—By withholding his signature from the bill permitting electric railways to engage in the jitney automobile business, Governor Holcomb has prevented the measure from becoming a law. The Governor acted in response to the appeals of several of the electric railways, which announced that they considered the bill useless in the form in which it was finally passed on the last day of the General Assembly session.

**Commission After Violator of Its Order.**—The first case in court of the Public Service Commission of Pennsylvania against a public service defendant is now under way in the Common Pleas Court of Allegheny County. The action is a test case brought by the commission as a warning against violations of public service laws. A. W. Behling, a motor bus operator of Pittsburgh, is accused of ignoring an order of the commission to desist from serving as a public carrier without a certificate.

**City Has Motor Bus Rights.**—Walter F. Meier, corporation counsel of Seattle, Wash., has advised Thomas F. Murphine, superintendent of public utilities, that the city has the authority to operate motor buses as feeders to the Seattle Municipal Railway. The Council has been asked by several communities to start bus service from outlying sections to connect with the city railway lines. Residents and property owners of Magnolia Bluff have agreed to give the city two large motor buses provided they are operated in connection with the railway lines into that district.

**I. T. S. Using Keokuk Power.**—The Quincy (Ill.) Railway, included in the Illinois Traction System, has made arrangements whereby power from the Keokuk dam can be transformed in the company's power house. On one or two occasions previously, in emergencies, the cars have been run with Keokuk power, but it has always been obtained through the plant of the Quincy Gas, Electric & Heating Company. The use of Keokuk power transformed directly marked an interesting step in the rehabilitation of the Quincy Railway. After their completion of the installation of the three rotaries, the steam plant will be closed down and held for emergencies when the Keokuk power may be off temporarily.

**Bay State Labor Difficulties Easier.**—Labor difficulties on the Bay State Street Railway, Boston, Mass., which threatened to involve many divisions in a strike, have become less disturbing through conferences between company and union officials and the pending arbitration of disputed points. During the week ended May 31, a two-day strike took place on the Lawrence (Mass.) division over the refusal of the company to reinstate a motorman. The strike was called off by advice of J. H. Reardon, Worcester, international vice-president, who stated that the walkout was in violation of the agreement between the men and the company. It was announced at Lawrence that the company will provide employees with passes subject to photographic identification.

**Union Buttons a Problem Again.**—After a tie-up of six hours, service on the railway lines of the Toledo Railways & Light Company, Toledo, Ohio, was resumed on May 30 pending receipt of official word from the War Labor Board at Washington, that the wage increase granted the conductors and motormen included the right to wear the union button, one of the principal points in the controversy, which resulted in a lockout three years ago. Union officials said they had received the official award from the War Labor Board. Frank R. Coates, president of the Toledo Railways & Light Company, said he had not received official notification of the award; but rather than disappoint the holiday crowds had instructed the cars to be operated regardless of whether or not the men wore their union buttons.

**Restraining the Auto "Nuisance."**—An ordinance will be introduced in the City Council of Seattle, Wash., revising the traffic laws of the city, and placing rigid restrictions on automobile traffic. Drastic steps are to be taken to prevent inexperienced drivers from operating automobiles, and Thomas F. Murphine, superintendent of the public utilities, is recommending the passage of such an ordinance. The ordinance will embody the recommendations of the police and utilities departments, and it is believed will do much to relieve the congestion of traffic in the downtown district. One of the provisions of the ordinance will be that every purchaser of an automobile be required to show his qualifications as a driver before being permitted to drive his car downtown. No person will be permitted to drive a car without a permit.

**Separation of Construction and Regulation Now Complete.**—The rapid transit construction work formerly vested in the Public Service Commission for the First District of New York has been turned over to John H. Delaney, recently appointed by Governor Smith as transit construction commissioner, under the bill separating the functions of the commission, passed by the Legislature of 1919. Commissioner Delaney assumed his new duties on June 2. The rapid transit construction functions were taken over by the Public Service Commission for the First District from the old Rapid Transit Commission on July 1, 1907. Under the commission the contracts were entered into for practically all of the newer lines embraced in the dual system of rapid transit. Mr. Delaney will take up this work and proceed to the completion of the system. A large part of the engineering force of the old Public Service Commission will be under the jurisdiction of Mr. Delaney. The regulatory functions formerly exercised by the Public Service Commission for the First District are vested in Commissioner Lewis Nixon, who, as a single commissioner, succeeded the former body composed of five commissioners. Mr. Nixon has also, since taking office, exercised the rapid transit construction functions.

## Programs of Meetings

### Pennsylvania Street Railway Association

The annual meeting of the Pennsylvania Street Railway Association will be held at the Penn-Harris Hotel, Harrisburg, on June 27 and 28.

### City Officials to Discuss Railways

At the tenth annual conference of city officials of New York State at Schenectady on June 10 to 12, one session is to be devoted to a discussion of the electric railway situation. This session will open at 9.30 o'clock on Wednesday morning, June 11, and will be presided over by Mayor Leroy Barnes of Binghamton. The speakers, as announced in last week's issue of this paper, will include T. E. Mitten, Delos F. Wilcox, Harlow C. Clark and Thomas Conway, Jr.

### Central Electric Railway Association

Final arrangements are being made for the mid-summer meeting and cruise of the Central Electric Railway Association from June 30 to July 3. It is planned to restrict the number to 350 to avoid crowding. Up to June 1 tickets had been sent out for nearly 250. It is therefore evident that those who desire to go should make the earliest possible application to secure reservation. In this connection it is pointed out particularly that electric railway officials outside the Central Electric Railway Association territory have been extended the privilege of joining the excursion.

The program for the meeting will probably be announced very shortly. Arrangements for the trip itself were completed some time ago. They include the reservation of the steamer *South American*, one of the finest passenger steamers on the Great Lakes. This vessel, built in 1914, has accommodations in her dining room for seating more than 280 at a time, and is strictly modern in all other appointments.

The *South American* is scheduled to leave the White Star Line docks at Toledo at 9 a. m. on June 30, proceed from Toledo to Lake Erie and up the Detroit River to Detroit, thence through Lake St. Clair and River St. Clair into Lake Huron, thence to Perry Sound, Georgian Bay, Owen Sound, Mackinac Island, from whence the ship will proceed down Lake Michigan, running into Harbor Springs, thence to Benton Harbor, thence across Lake Michigan to Chicago, where the boat will dock on July 3 at about 4 o'clock in the afternoon.

Tickets for the trip on the steamship, including meals and berth for the three days cruise from Toledo or Detroit to Benton Harbor or Chicago will cost $26.50 each, including government war tax. Tickets should be secured from John Benham, vice-president of the International Register Company, 15 South Throop Street, Chicago, Ill.

# Financial and Corporate

## Detroit Decline Stops

### Increased Earnings in 1918 Almost Succeed in Meeting High Expenses of Operation

During the calendar year 1918 the Detroit (Mich.) United Railway succeeded in largely checking its financial losses. Although the net income in 1918 still showed a falling off of $80,947 or 3.2 per cent below that of 1917, this was very small compared with the decrease in net income of $705,262 or 24.4 per cent in 1917 below that of 1916.

The main reason for this showing is that during 1918 the increase in gross earnings from operation was more than sufficient to take care of the rise in operating expenses, as was not the case in 1917. In 1918 the gross earnings from operation gained $1,586,079 or 9.1 per cent, while the operating increases rose $1,498,549 or 11.3 per cent. In 1917, however, the gross earnings advanced $1,391,270 or 8.6 per cent and the operating expenses $2,043,988 or 18.2 per cent.

TABLE I—INCOME STATEMENT OF DETROIT UNITED RAILWAY FOR CALENDAR YEARS 1917 AND 1918

| | 1918 | | 1917 | |
|---|---|---|---|---|
| | Amount | Per Cent | Amount | Per Cent |
| Gross earnings from operation: | | | | |
| Passenger | $ 17,696,782 | 93.1 | $16,370,239 | 93.9 |
| Express | 1,265,311 | 6.6 | 1,000,869 | 5.7 |
| Mail | 12,433 | 0.1 | 11,748 | 0.1 |
| Special car | 39,492 | 0.2 | 45,083 | 0.3 |
| Total | $19,014,018 | 100.0 | $17,427,939 | 100.0 |
| Operating expenses | 14,758,339 | 77.6 | 13,259,790 | 76.1 |
| Net earnings from operation | $4,255,670 | 22.4 | $4,168,149 | 23.9 |
| Other income | 449,736 | 2.3 | 411,737 | 2.4 |
| Gross income | $4,705,415 | 24.7 | $4,579,886 | 26.3 |
| Interest on funded and floating debts and taxes | 2,610,831 | 13.7 | 2,404,355 | 13.8 |
| Net income | $2,094,584 | 11.0 | $2,175,531 | 12.5 |
| Amount credited to depreciation reserve | $600,000 | 3.1 | $800,000 | 4.6 |
| Amount provided for federal taxes | 150,000 | 0.8 | 150,000 | 0.9 |
| Dividends paid | 1,200,000 | 6.3 | 1,118,750 | 6.4 |
| Total | $1,950,000 | 10.2 | $2,068,750 | 11.9 |
| Balance transferred to surplus | $144,584 | 0.8 | $106,781 | 0.6 |

TABLE II—DETROIT PASSENGER AND MILEAGE STATISTICS

| | 1918 | 1917 |
|---|---|---|
| Revenue passengers | 319,843,176 | 356,208,429 |
| Transfer passengers | 103,608,353 | 119,962,125 |
| Employee passengers | 7,416,741 | 8,557,264 |
| Total passengers | 430,868,270 | 484,727,818 |
| Receipts per revenue passenger | $0.0553 | $0.0459 |
| Receipts per passenger | 0.0410 | 0.0337 |
| Car mileage | 53,931,394 | 58,957,941 |
| Earnings per car-mile | $0.3526 | $0.2956 |
| Expenses per car-mile | .2736 | 0.2249 |
| Net earnings per car-mile | .0790 | 0.0707 |

NOTE.—In addition to the Detroit city lines, the foregoing statistics embrace all the lines owned and controlled by the Detroit United Railway.

The largest part of the gain in 1918, of course, came from the passenger earnings. These showed an increase of $1,326,543 or 8.1 per cent. The express earnings, however, showed a marked improvement, the gain amounting to $264,442 or 26.4 per cent.

The net earnings from operation in 1918 showed a gain of $87,530 or 2.1 per cent, which was increased by an advance in other income. The increase in interest charges and taxes, however, was sufficient to cause the above-mentioned decline of $80,947 or 3.2 per cent in net income. Dividend payments were increased from $1,118,750 to $1,200,000, but the depreciation allowance was reduced from $800,000 to $600,000. As a result the balance transferred to surplus in 1918 amounted to $144,584 as compared to $106,781 in 1917.

#### WHAT THE TABLES SHOW

The foregoing figures, shown in detail in Table I, summarize the business of the Detroit United Railway, the Rapid Railway System, the Sandwich, Windsor & Amherstburg Railway, the Detroit, Monroe & Toledo Short Line Railway and the Detroit, Jackson & Chicago Railway.

Table II gives passenger and mileage statistics of the system for the last two years. The points to be noticed are the decreases in passenger traffic and in car mileage and the increases in receipts per passenger and car-mile earnings for the combined lines.

#### $1,079,278 FOR ADDITIONS

During 1918 the Detroit United Railway and its affiliated lines spent $1,079,278 for additions to property. The largest items were $239,858 for right-of-way, $123,733 for rails, rail fastenings and joints, $94,059 for grading and $91,698 for track and roadway labor.

The $425,000 of first consolidated mortgage bonds of the Wyandotte & Detroit River Railway, which matured on Dec. 1, 1918, were paid and a like amount of Detroit United Railway first consolidated mortgage bonds was issued; likewise with $50,000 of Detroit Railway bonds.

## Indianapolis Merger Approved

### Stockholders of Street Railway and of Terminal Company Sanction Corporate Changes

At the meeting of the stockholders of the Indianapolis (Ind.) Street Railway held on June 2 to consider the merger of the company and the Indianapolis Traction & Terminal Company, as outlined in the ELECTRIC RAILWAY JOURNAL for May 31, page 1068, it was decided by vote of 27,879 shares to 14,863 shares to combine the two properties.

#### PLAN AMENDED

Amendments were offered and voted upon to meet certain objections offered by the city and others against the merger agreement as first submitted. One amendment provides that the consolidated company shall take over all obligations of existing franchises. This was provided to meet the objection that the consolidated company would be under no franchise limitations of the constituent companies. Another amendment provides that if the new consolidated company should fail in any year to pay 6 per cent on the $5,000,000 of preferred stock to be issued, then the exclusive voting rights shall go to the preferred stockholders as long as the default continues. A further amendment provides that the right to refund existing bonds under the old mortgages by the issuing of the new merger bonds of the consolidated company shall not be exercised before April, 1931, thus leaving only two years in which the bonds maturing in 1933 can be exchanged to meet the new bond issue. This amendment was made to meet criticism that under the merger the fixed charges of the company might be greatly increased by further bond issues.

#### SOME PROTESTS ENTERED

During the meeting, protests were heard from attorneys representing certain stockholders who were doubtful as to the advantages to be gained in exchanging Indianapolis Street Railway stock for the new consolidated stock. Mr. Hornbrook, representing the stockholders' committee, asserted that it was shown at the hearing of the fare case before the Public Service Commission last fall, and had been virtually admitted by the Mayor and Corporation Counsel, that the property of the Indianapolis Traction & Terminal Company more nearly represented the value of the bonds and securities issued than did the property leased from the Indianapolis Street Railway, and that by the feature of the proposed agreement, which provides that more than $2,000,000 of bonds of the two companies retired by sinking fund payments may be refunded to supply money for conditions and betterments, it will be possible for the consolidated company to finance the extensions and improvements which have been requested by the city of Indianapolis.

The boards of directors of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company met on June 3, and confirmed and approved the amendments offered at the stockholders' meeting. The merger agreement was then executed by the officials of both companies and now awaits the approval of the Public Service Commission of Indiana.

## Segregation in Pittsburgh

### Way Opened to This End in Decision Holding Rights of Mortgagor Are Absolute

The way was opened for the segregation of the properties making up the Pittsburgh (Pa.) Railways on May 29 when the United States Court of the Western Pennsylvania District handed down a decision granting permission to the Union Trust Company as trustee to foreclose the mortgage it holds on the properties of the Southern Traction Company.

#### COURT ESTABLISHES POINT

Incidentally it was established that, in Pennsylvania at least, the contract rights of a mortgagor must be recognized by a federal court as paramount to the public interest. Counsel for the city of Pittsburgh and the receivers of the company, who are operating the lines under the direction of the Federal Court, had raised this objection to the petition of the trustees of the bondholders for permission to foreclose, but in his opinion Judge Charles P. Orr dismissed this plea without entering into its merits.

There appears to be no immediate prospect of actual foreclosure proceedings. Counsel for the bondholders' trustee admit this, in view of the intention of the city law department to oppose the foreclosure by further court proceedings. The next move will be the filing of exceptions to Judge Orr's ruling by C. K. Robinson, special traction counsel for the city. It is expected that counsel for the receivers will join the city in this opposition.

#### ANOTHER SNARL ADDED

At all events the foreclosure proceedings, when opened, undoubtedly will add another snarl to the almost inextricably tangled skein of the Pittsburgh Railways' affairs, for the question will rise then as to just what the Southern Traction Company is. On the face of things it is merely one of the underlying companies of the railways. But when the Pittsburgh Railways was organized one of the steps was absorption by the Southern of the Consolidated and the United Traction Companies, the three including the great bulk of the properties now forming the Pittsburgh Railways. One of the probabilities in the case, recognized by counsel for both the city and the receivership, a claim by the Southern's bondholders for all of the rolling stock of the Pittsburgh Railways, a claim many attorneys feel might be established in court, leaving the receivers with plenty track but no cars. In the narrower view the bondholders of the Southern Traction Company are protected only by a mortgage on certain lines operated by it before the consolidation.

The petition for permission to foreclose was presented as a result of default in the semi-annual interest on the first mortgage 5 per cent bonds of the Southern Traction Company. This issue is of $4,000,000 and as interest was defaulted last October and April the sum directly in question is $200,000 and interest.

Ranking, as to interest, with the permission of the court to foreclose, is its ruling that bondholders' rights can stand in a federal court in Pennsylvania, against claims of public interest. Heretofore the Federal Court, ruling on the affairs of the Pittsburgh Railways, has seemed to take a somewhat different attitude. Last fall when Charles A. Fagan, one of the receivers, took a decided stand against the further payment of fixed charges while the public was inadequately served by the railway, he was sustained promptly by the court. Shortly after that his colleagues in the original receivership, J. D. Callery and H. S. A. Stewart, withdrew, being succeeded by S. L. Tone and W. D. George.

#### BASIS OF COURT RULING

Judge Orr based his ruling on two recent decisions of the Pennsylvania Supreme Court, in which the right of a mortgagor to foreclose under the terms of his mortgage is found to be absolute. These cases are Philadelphia Trust Company, trustee, vs. Northumberland County Traction Company, 258 Pa. St., 152, and Columbia & Montour Electric Company vs. North Branch Transit Company, 258 Pa. St., 447. He explains that he accepted the guidance of the highest State court in the matter because the Southern Traction Company is a creature of the State of Pennsylvania and the mortgage in question was made under the laws of Pennsylvania.

The opinion sets forth that to prevent the trustee from proceeding or even to cause the trustee temporarily to postpone exercise of the remedy provided by the mortgage would be to some extent an attempt by the court to impair the obligation of a contract. In answer to a hypothetical objection that the constitutional prohibition against impairment of contracts is intended against legislative and not judicial acts, Judge Orr replies that, as a creature of the Legislature, a court of inferior jurisdiction ought not to have powers higher than those of its creator. So the permission to foreclose is granted, the only stipulation being that proceedings be instituted in the United States Court of the Western Pennsylvania District.

Judge Orr remarks, early in his opinion, that the sole answer to the petition brought by respondents was an offer to prove that granting of it would be against the interest of the public. At the hearing this was objected to by counsel for the bondholders' trustee, and the court reserved decision on the objection. In the opinion the objection is sustained and evidence that foreclosure would be contrary to public interest is ruled out as incompetent, irrelevant and immaterial.

## Authorizes $20,000,000 of Receiver's Certificates

Judge Julius M. Mayer, in the Federal District Court, has signed a decree authorizing Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, to issue $20,000,000 of receiver's certificates.

In the memorandum filed with the decree, Judge Mayer explained his reasons for deciding as to certain disputed points. He dwelt especially upon the point that had been urged by ex-Judge Samuel Seabury, representing tort claimants for the Malbone Street accident last December in which nearly 100 persons were killed and for which claims for damages aggregating $1,500,000 have already been filed. Judge Mayer made it clear that there is no intention of neglecting such tort claims. but he pointed out also that such claimants are as much interested as other creditors of the system in preserving the property of the company and having it conducted in such a way as to insure an adequate return from the money invested.

Judge Mayer also made a brief reference to the objections that were raised at a hearing on the subordination provision in the proposed decree under which the first refunding gold mortgage of July 1, 1902, with the Central Union Trust Company, as trustee, under which $27,627,000 of bonds have been authenticated, would be subordinated to the present issue of certificates.

## $25,000,000 Note Issue

Henry L. Doherty & Company, New York, N. Y., associated with the management of the Cities Service Company, are forming a syndicate to underwrite an issue of $25,000,000 sinking fund, convertible 6 per cent notes of the Empire Gas & Fuel Company, which is the principal oil subsidiary of the Cities Service Corporation.

The notes will be dated June 15, 1919, and will mature on June 15, 1924. They are convertible at any time par for par into a new issue of 8 per cent cumulative preferred stock of the Empire Gas & Fuel Company. The notes will be offered at 97½. The net earnings of the Empire companies for the twelve months ended Feb. 28 are reported to be approximately $23,000,000.

## Growing Too Complicated

### Special Master Inquiring Into St. Louis Receivership Proceedings Issues a Warning

The United Railways receivership suit now being heard at St. Louis, Mo., is becoming so complicated, in the opinion of the special master hearing the case, that there is danger of both the court and counsel losing a proper perspective of the matter.

### COURT ITSELF CONFUSED

Toward the close of the session on June 2, and just before adjourning the hearing to June 5, Special Master Lamm declared from the bench:

> This case is growing very complicated. It has come to a point where if I have got to pass on it, I want briefs. I'll give counsel a week in which to file the briefs. There is such a thing as this getting so complicated that the master won't understand it, the court won't understand it, and counsel themselves may be in doubt.

The hearing on June 2 was given over to arguments of Charles H. Cole, Chester, Ill., and W. B. Thompson, St. Louis, for leave to intervene on the part of the defense in the suit for receivership and accounting of John W. Seaman, New York, against the United Railways. The petitioners contended that the company by filing an admission of insolvency in the Adler receivership proceedings disqualified itself for the task of defending itself. They argued that the stockholders should be permitted to defend the company against the charge of insolvency and asked that Mr. Seaman be required to furnish bond to cover cost of the suit and the possible damages of a receivership.

In commenting on the argument of attorneys for the intervenors Mr. Lamm said:

> My mind has been dwelling on the timeliness of this intervention. This case has been pending nearly a year and you are just filing this action. It is a question in my mind whether you have not passed the days of grace.

### COMPANY ABLY REPRESENTED

During the discussion Henry S. Priest, general counsel for the United Railways, declared that the United Railways as a matter of fact is not insolvent. He said the company was unable to meet its obligations as they matured chiefly because of the agitation aroused through this litigation. Mr. Priest said that he had on his desk a circular from one of the city's best known financial heads saying that an effort was being made to mature the company's general mortgage bonds and cut out the St. Louis Transit Company bonds and other indebtedness. He added that "the extreme depression because of the war" helped to impair the company's ability to meet its obligations as they matured.

In referring to the argument of Attorney Ford Thompson for the intervenors that the company through its admission of insolvency in the Adler suit made it impossible to prove its solvency at the present hearing, Special Master Lamm took occasion again to compliment Attorney Priest, whose argument in answer to the closing argument of attorney for Seaman during the previous week brought out a strong laudatory expression from the bench. It had been his observation that the defense has been very ably represented in this case, Master Lamm said to Attorney Thompson at the close of his plea for permission from the court to "assist the defense."

## Dallas Tells the Public

### Company Adopts Policy of Giving the Public Monthly Data on Financial Condition

The net earnings of the Dallas (Tex.) Railway for April, 1919, amounted to $32,636, an increase of $6,093 or 23 per cent over the earnings for the corresponding month of last year. The net earnings for April were equivalent to a net return of 4.98 per cent a year on the agreed property valuation. The present franchise allows a 7 per cent return.

Setting forth the financial condition of the Dallas Railway, the directors have published in all the local newspapers of Dallas a five-column advertisement showing in detail the property valuation, earnings since the properties were taken over, authorized return of 7 per cent and deficit. In this advertisement the company makes the following statements:

> During 1917 the street railway situation was submitted to the voters for a full discussion and to an election held on April 3, 1917, at which time a certain franchise was granted by the voters of the city to the Dallas Railway. Appreciating that the growth of the city is inseparably linked with the success of the street railway company, and that the surest manner of securing the friendly co-operation of our patrons is by keeping the public fully advised as to the financial condition and the various problems confronting the company, the management, with the sanction of the board of directors, submits the following:

| | |
|---|---|
| Total property value, determined in the manner provided by the franchise — close of business April 30, 1919 | $8,082,682 |
| Authorized return (7 per cent on property value) for April | 45,898 |
| Gross return from all sources, month of April, 1919 | 202,238 |
| Operating expenses, April, 1919 | 169,602 |
| Balance earned for return, April, 1919 | 32,636 |
| Shortage in permitted return, April, 1919 | 13,262 |
| Amount net earnings for April available for distribution to stockholders | None |
| Amount net earnings for April available for transfer to surplus reserve | None |
| Total shortage for nineteen months (from Oct. 1, 1917, to April 30, 1919, inclusive) on permissible return | 355.285 |

> The management feels that the railway's problems are also the public's, as a financially crippled railway system cannot expand and give adequate service. From month to month we will keep you fully advised in this manner. If we succeed, we want you to know it; if we are not succeeding, we likewise want you to know it.

This statement is signed by J. B. Walker, secretary-treasurer; Richard Meriwether, vice-president and general manager, and the company's directors. The deficit of $355,285 is said to be due to three things—First, operation of the jitneys; second, the increased cost of labor, and third, the increased cost of materials.

## Council Approves Valuation

### Minneapolis Body Fixes Upon $24,000,000 and a Return of 7 Per Cent for Local Railway

The City Council of Minneapolis, Minn., by a vote of sixteen to ten has approved the report of its committee on street railways placing the value of the property of the Minneapolis Street Railway at $24,000,000 with a guaranteed return of 7 per cent to the company.

The company now has ten days in which to accept the proposal. If it accepts, a service-at-cost franchise will be drawn and submitted to the company for approval and if approved will go before the voters within ninety days thereafter. Socialists voted against the adoption of the committee report by the Council.

### MANY VALUATIONS MADE

Various valuations have figured in the long drawn out preliminaries, that of the city engineer being $25,914,307, of the City Council $22,553,150 and of the company $24,500,000. The franchise will be drawn under the enabling act, Chapter 124, General Laws of Minnesota for 1915, which permits the city to negotiate with the company and submit a franchise to referendum vote before the expiration of the present franchise grant in 1923.

Charles D. Gould, the city attorney, has proposed as purposes in the franchise the following:

> 1. To furnish the Minneapolis public with adequate street car service at all times, at a rate of fare sufficient to provide the facilities for such service, meet the legitimate cost of operation maintain the property continuously in first-class condition, and pay to the company its fixed minimum return upon capital investment.
> 2. To provide for effective public control of service and extensions.
> 3. To provide for such methods and measures of public supervision of the property as will assure honest, efficient and economical management thereof in the public interests.
> 4. To provide for an equitable division of the surplus earnings between the city and the company.
> 5. To provide for the purchase of the property by the city, and the terms, times and conditions thereof.

### MAYOR OPPOSED TO MEASURE

By decision of the Council at its meeting on May 29 the fourth section is waived as the city will control the division of surplus earnings, and will be able to utilize it to lower fares, retire bonds, make improvements, or for any purpose specified in the ordinance. A clause will give the city right to buy the property at the end of each five or ten-year period, at the end of the period of the franchise (which may not be more than thirty years without renewal), and thereafter at the end of any five-year period upon the furnishing of a one-year written notice to the company.

Mayor J. E. Meyers, who holds that a $20,000,000 valuation and a 6 per cent guaranteed return are enough for the company, is expected to make a campaign against the adoption of the franchise as proposed.

### Sale of Collateral Postponed

The sale of all the capital stock of the International Railway, Buffalo, N. Y., advertised to have been held in New York on May 27, has been adjourned until June 25. The postponement has been consented to by the bondholders' protective committee of the International Traction Company, of which Elliott C. McDougal, Buffalo, is chairman. The junior security holders of the traction company sought the postponement, until after the State Court of Appeals has handed down its decision on the right of the Public Service Commission to intervene and regulate fares in Buffalo under the operation of the Milburn agreement.

The junior interests include those who own the stock, both common and preferred, of the traction company or the debentures that are junior to the traction company bonds. In the event of the sale of the collateral back of the traction company bonds, the interests of these junior debenture holders would be wiped out.

The holders of the stock of the railway company desired a postponement of the sale in order that they might have an opportunity to work out a solution of the financial problem of the International Railway and the International Traction Company. For some time negotiations have been in progress between the traction company bondholders' committee and representatives of the railway and holders of the traction company stock for the purpose of bringing about some sort of an agreement.

## Financial News Notes

**Memphis Makes Up Interest Payment.**—The receivers of the Memphis (Tenn.) Railway have deposited with the Central Union Trust Company, New York, N. Y., funds for the payment of the interest due in January, 1919, on the consolidated mortgage 5 per cent bonds of the company, together with five months' interest at 5 per cent on the deferred payment.

**Would Abandon Bartlesville Loop.**—Application has been made to the Oklahoma Corporation Commission by the Bartlesville (Okla.) Interurban Railway for permission to abandon and take up a portion of its track on the "loop" within the city limits of Bartlesville. The company set forth that little business was done on this line and that the steel and ties were badly needed for use elsewhere on the system. The matter has been taken under advisement.

**Sale of Collateral Advertised.**—The American Railway & Power Company, having defaulted in the payment of interest due on Nov. 1, 1918, upon its 6 per cent three-year gold coupon notes dated May 1, 1916, the Columbia Trust Company, New York, N. Y., trustee under the agreement of May 1, 1916, will sell the securities pledged with it, to wit: $276,000 of 6 per cent cumulative preferred stock of the Burlington Railway & Light Company, Burlington, Iowa, a Delaware corporation. The sale is scheduled to take place in New York, on June 11, 1919.

**New Owners in Control at Claremont.**—The railway lines of the Claremont Railway & Lighting Company, Claremont, N. H., have passed to the ownership of the Claremont Street Railway. The stockholders in the Claremont Street Railway, a new corporation, granted a charter at the last session of the Legislature, are local manufacturers, who bought the bonds of the old company and brought foreclosure proceedings. The road was struck off to them at public auction recently for $85,000, no other bidders making an appearance.

**Progress Made on Spokane Merger.**—Progress is being made in the efforts to work out a consolidation of the city lines of the Washington Water Power Company and the Spokane (Wash.) Traction Company. The engineers of the two companies have agreed upon the lines to be retained, but the details are still under consideration. Waldo G. Paine, vice-president of the Spokane & Inland Empire Railroad, prefers that the proposed charter changes and merger franchise be submitted at a special election and not be deferred until the regular election in November, as suggested at the City Hall.

**Common Dividend Payment Made.**—A semi-annual dividend of 1¾ per cent has been declared on the $9,460,000 outstanding common stock of the American Railways, Philadelphia, Pa., payable on June 14 to holders of record of June 10. This is the first distribution on the common stock since December, 1917, when a semi-annual dividend of 2 per cent was paid. The declaration of the dividend insures the payment of the semi-annual interest on the $6,479,750 of National Properties Company collateral trust bonds due on July 1. The bonds now bear 4½ per cent interest. American Railways common furnishes the collateral for the issue of bonds.

**Default on Lafayette Bonds.**—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., having given notice that default would be made in the payment of interest due on June 1, on Lafayette Street Railway first mortgage 5½ per cent bonds, a committee consisting of Dimner Beeber, president of the Commonwealth Title Insurance & Trust Company, Philadelphia, Pa., Warren G. Griffith, and Walter L. Haehnlen of Charles Fearon & Company, Philadelphia, has been formed for the protection of the interests of the bondholders of the Lafayette Street Railway. The committee has asked holders to deposit their bonds with the Real Estate Trust Company, Philadelphia.

**Another Abandonment Hearing.**—The Public Service Commission for the Second District of New York at the hearing on May 21 on the petition of the Southern New York Power & Railway Corporation to abandon the Normal School line in Oneonta, decided not to receive evidence of operation of the entire road. The railroad, at a hearing on May 7, sought to introduce evidence which it had overlooked covering operating receipts and expenses and necessary repairs in Oneonta and outside, including an estimate that $423,000 would be required to put its main line in condition. The commission received evidence as to the Oneonta operation, but reserved decision as to admission of further evidence relative to operating expense and receipts for the entire system. The commission on May 19 decided that it would not take evidence covering the entire road. The case is still open.

**Would Purchase Leased Line.**—Negotiations are reported to be pending for the purchase by the Interstate Public Service Company of the interurban property of the Indianapolis & Louisville Traction Railway between Seymour and Sellersburg, Ind. The Interstate Public Service Company controls the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, and operates under lease the property of the railway between Seymour and Sellersburg, for which it is now negotiating. This purchase will give the Interstate Public Service Company entire control of the interurban line between Louisville and Indianapolis, as the section between the two cities was the only portion that it did not own, with the exception of the bridge over the Ohio River. The company uses the Big Four bridge over the river.

**$1,036,000 of Bonds Authorized.**—An order has been signed by Public Service Commissioner Lewis Nixon permitting the Hudson & Manhattan Railroad to issue and sell bonds of the face value of $1,036,000, under its first lien and refunding mortgage of $65,000,000 made on Feb. 1, 1913. The proceeds of the bonds are to be used to reimburse the treasury of the company for expenditures made from income between June 1, 1915, and Dec. 31, 1917. The money was spent principally to make payments on real estate mortgages and to meet installments on purchases of cars. The bonds are to draw 5 per cent interest and become due on Feb. 1, 1957. Interest is payable semi-annually. The bonds are to be sold at not less than 80 per cent of par. The company was allowed to use all or such portion of $207,200 as might be necessary to meet discount and expenses of the sale of the bonds, which sum, however, must be amortized from earnings of the company.

# Traffic and Transportation

## Jersey Hearings Continue

### Experts Approve Principle of Zoning Plan—Professors Richey and Jackson Testify for Commission

Prof. Albert S. Richey testified for the commission before the Board of Public Utility Commissioners of New Jersey on May 20 in the Public Service Railway zone fare hearing. It was his opinion that in the future charges for electric railway service must be upon the basis of service rendered with fares arranged to correspond with the actual distance traveled. Professor Richey also appeared as a witness on May 21. His only criticism of the zone plan as proposed was that it was not flexible enough. He thought that the initial fare of 5 cents should cover not less than two zones, instead of one zone as contemplated in the report of the company. Professor Richey was again a witness on May 26. He was examined as to his business relations with the Public Service Railway prior to the present zone fare hearing.

### DAY OF FLAT FARES GONE

On May 27, Robert M. Feustel, of Sloan, Huddle, Feustel & Freeman, was a witness for the commission. He said that the zoning arrangement could be made applicable to the Public Service Railway providing the mechanical difficulties of fare collection were overcome. He contended that flat fares must be eliminated before just and reasonable rates could be established. He favored a zoning system under which passengers could board cars at any point and ride for at least two zones for an initial 5 cents. He regarded the Public Service Railway zone report as a very courageous attempt to solve the American electric railway problem.

On May 28 Frank H. Sommer, counsel for the municipalities opposing the zone fare plan, objected to having the plan go into effect on July 1 and asserted that the municipalities which he represented should be allowed sufficient time to prepare as comprehensive a case against the zone plan as had been allowed to the company. The court took the question under advisement and then announced that the zone hearing would be adjourned until June 4. President McCarter of the Public Service Railway declared that any attempt which would result in delaying the proceedings very long "means a receivership for the railway, if it means anything." The company could not continue to go on unless relief were granted within a reasonable time.

On June 4 the hearings were resumed with Lieut.-Col. Philander Betts, chief engineer of the commission, on the stand. He testified that the commission has the information needed in checking the valuation figures presented by the railway company, and that the commission had approved expenditures of about $35,000,000 during the period of its jurisdiction.

On June 5 Lieut.-Col. Dugald C. Jackson took the stand for the commission. Quotations were read from his book on "Street Railway Fares" to show that for years he had favored a zone system. As to the system proposed, he is quoted as saying: "It is a definite well-planned effort to solve the problem."

The following extract from a *Newark Evening News* editorial entitled "The Long and Short of It," summarizes the situation from the standpoint of that paper:

> A proper zoning system, in which the general welfare is conserved, appears the correct solution. Such a system, however, must not place an undue burden either upon the city riders or upon those from the outlying districts. The charges must be equalized on the basis of the benefits conferred. This equalization must be provided for here. The question now before the Public Utilities Commission is whether this has been done in the Public Service zone plan. The underlying principle may be right, and yet the details of the superstructure may be wrong or the charges excessive. This is the crux of the whole business in New Jersey. The latest expert evidence given would seem to indicate that a revision may be needed to make the plan equitable.

## Increase for Winona Company

The Public Service Commission of Indiana has authorized the Winona Interurban Railway, Warsaw, Ind., to increase its basic passenger fare from 2.5 cents a mile to 2.75 cents a mile; to charge 5 cents straight for fares in Peru; to sell 2000-cent coupon books at $17.50, and twenty-coupon books at 15 per cent less than the basic fare and to establish a 10-cent minimum fare for interurban service.

The commission found that the road has been earning only 4.03 per cent gross on its tentative value of $26,500 a mile, and authorized the road to increase fares, but not to the limit proposed by the company. The commission directed the company to credit its city lines with 2.5 cents for each passenger carried to and from the city terminals on interurban cars. The commission denied the road an added cash fare excess charge to be refunded later.

The commission has denied the petition for rehearing filed by the Chicago, Lake Shore & South Bend Railway, which some time ago sought to have its passenger basis increased to 3 cents a mile. The basis now is 2.75 cents.

The commission has denied also the petition of the Central Electric Traffic Association to cancel the Chicago, Lake Shore & South Bend interchangeable and local 2000-cent coupon books.

## Berkshire Service Considered

### Matter Before Commission of Resuming Operation on $3,000,000 Line with 8000 Tributary Population

Resumption of passenger service over the $3,000,000 Lee-Huntington line of the Berkshire Street Railway, Pittsfield, Mass., was urged before the Public Service Commission of Massachusetts at a hearing in Boston on May 29, the petitioners being officials and citizens of the towns connected and adjacent to the line. The line was built about six years ago and is of unusually heavy construction. It forms the only through connection between eastern Massachusetts and the Berkshire district, and has been operated at various periods separated by suspension of service due to severe winter conditions, the influenza epidemic of last fall and inadequate revenue. The company was represented by A. M. Robinson its counsel, and C. Q. Richmond, Pittsfield, Mass., general manager.

The financial disabilities of the Berkshire company, it was urged, render the resumption of service over the Lee-Huntington line inexpedient. The first four months of this year show a loss of $30,780 below the bare cost of operation plus accrued taxes on the system as a whole. Interest on the funded debt is not included. The company owes the Federal Railroad Administration $50,000 in back freights and demurrage, and there are $60,000 of last year's taxes yet to be paid. A fare increase was effective in November, 1918.

### TRAINMEN WANT WAGE INCREASE

The platform men ask for a wage increase to $5 a day of eight hours, with increases in proportion for other employees. It is estimated that the desired increases in wages now under consideration would cost the company $275,000 a year. Mr. Richmond said that the private automobile has cut heavily into the company's revenue. Seventeen one-man cars have been purchased from the Wason Company and an attempt is being made to recapture some of the lost business. On the Pittsfield-Dalton line, for instance, it is proposed to provide a fifteen-minute headway with light cars and it is believed that this will enable the company to compete with the existing jitney service. The Berkshire company has paid no dividends since 1912.

Mr. Richmond said that the total tributary population along the Lee-Huntington line is only 8000, and that the gross earnings per car-mile in April, 1918, when it was reopened after a severe winter, were 10.81 cents, compared with an average of 31.96 for the entire system. In August the line earned 29.06 cents per car-mile, compared with 38.16 cents for the system. In six days of October the total fares collected on the last fare limit entering Huntington were only $18.50. After the line was apparently completed it was necessary to expend $41,831 in preparing it for operation by the installation of safety-catch sidings, a portable substation, electric locomotive, etc. The line is 24 miles in length and has no car-housing facilities except at Pittsfield, 12 miles from its westerly end. Two substations must be started to secure service. The Federal Court decree requiring the New York, New Haven & Hartford Railroad to dispose of its electric railway properties by 1921 stands in the way of the Berkshire company's securing financial assistance from the New Haven. Its competitive possibilities as a through route have been greatly exaggerated. The company has not refused to handle freight over the line to and from various industries located upon it, but there seems to be no present means of supplying a paying passenger service.

At a recent conference in Westfield, Mass., to which reference was made in the ELECTRIC RAILWAY JOURNAL for May 31, page 1071, L. S. Storrs, president of the Berkshire company, offered to provide passenger service on the line if the towns involved would agree to make up the excess of its cost over revenue, but these communities have so far refused to assume any share of the burden. The hearing has been closed.

# Two-Cent Transfers for Capital

## Commission Grants Increase to Washington Railway & Electric Company and to Two Non-Petitioning Competitive Lines

The Public Utilities Commission of the District of Columbia on May 29 granted a transfer charge of 2 cents to the Washington Railway & Electric Company, to be added to the present 5-cent fare. Though the competitive Capital Traction Company and Washington-Virginia Railway had not applied for relief, the same charge was granted to them.

Though the commission had not finished the study of the valuation data recently compiled in the case of the Washington Railway & Electric Company, it estimated the fair value on April 30, 1917, as $14,919,427. Upon this it said the return should not be less than 6 per cent, adding that "even though in normal times a greater rate of return may be advisable, the commission feels that during the present reconstruction period justice to the public requires distribution of the war burden." Upon this basis the commission estimated that the company would need a net operating income of about $900,000, and after disallowing as rate factors recent increases in maintenance and damage allowances, the commission determined that $300,000 should be raised through a rate increase.

### THREE METHODS SUBMITTED

Continuing, the commission said:

The company through its expert witness, Prof. Albert S. Richey, submitted three methods of raising additional revenue; one, an increase to 7 cents in the flat rate of fare; another, a charge of 2 cents for transfers; the third, a two-zone system, with fares of 5 cents in the first zone and either an additional 5-cent cash fare in the second zone or tickets at the rate of 3 cents each. After considering all the arguments that have been advanced in favor of each of these methods and having in mind the additional revenue needed, the commission is of the opinion that the best means of raising that amount is by a charge of 2 cents for each transfer.

The number of transfer passengers carried on the Washington Railway & Electric Company's system during the calendar year 1918 was 23,002,474; during the first four months of 1919 the number was 7,754,-55, or an increase of 10 per cent over the corresponding months of 1918. Assuming that this rate of increase will obtain for the balance of the present calendar year, the commission estimates that the number of transfer passengers for that period will be 15,327,533, which at 2 cents each will amount to $306,550. There may be some falling off in the number of transferring passengers when a charge is made for that privilege, but the extent to which this will affect the revenue is problematical and will not be considered at this time.

The other electric railways in the District of Columbia, namely, the Capital Traction Company, the Washington-Virginia Railway, and the East Washington Heights Traction Railroad have made no request for increased revenue, and if these companies were in no sense competitive with the Washington Railway & Electric Company and were serving different parts of the district, the commission might be justified in authorizing rates of service for the Washington Railway & Electric Company different from those authorized for the other companies.

The Capital Traction Company, however, is to a very large extent in competition with the Washington Railway & Electric Company, as is the Washington-Virginia Railway. If a charge for transfers were made on the Washington Railway & Electric Company's system and not on the lines of these two companies a very large amount of traffic would be diverted from the Washington Railway & Electric Company's system to these two companies; and if this were done the probable decrease in revenue from this source would more than offset the increase in revenues due to the charge for transfers.

The East Washington Heights Traction Railroad does not come into competition with any of the other companies. Its line is very short, so that the commission will not order any change in the present free issue of transfers between this company and the Capital Traction Company.

The imposition of a charge for transfer service has long been recognized as justifiable when increased revenues for an electric railway system must be provided. It does not put so great a burden upon the public as a whole as would an increase in the flat rate, and it does add the burden to those passengers who avail themselves of the extra service involved in a transfer. As a general rule, the burden will fall upon long-haul passengers rather than short-haul passengers.

When this commission required the companies to grant free inter-company transfers, it did so upon the theory that so far as possible the street railway systems of the city should be treated as one. In applying this charge to both intra-company and inter-company transfers, the same theory is adopted.

It is the present practice on several of the lines of these companies to issue transfers or identification checks to passengers presenting transfers from other lines either of the same company or of other companies. If the 2-cent charge now proposed for all transfers were applied without distinction, it would require some passengers now paying 5 cents for a ride between two points involving the use of two transfers or a transfer and an identification check, to pay 9 cents for the same ride. To avoid this excessive rate of fare for such rides, the commission is of the opinion that no charge should be made for the second transfer or identification check.

The 2-cent transfer charge took effect on June 1, 1919, and will remain in force until Jan. 1, 1920. On Jan. 1, 1920, the old rates shall be restored automatically unless the commission shall have ordered otherwise.

The decision is the outcome of an application made on Feb. 18 for a further increase in rates after the companies had operated for five months under an increase of fare of 20 per cent.

# San Juan Wants Ten Cents

The Porto Rico Railway, Light & Power Company, San Juan, P. R., has applied to the Public Service Commission for an increase in the street car fare to 10 cents. The petition is an amendment to a similar petition filed in April, 1918, asking for a 7-cent fare. At that time, the company states, it was thought that a 2-cent increase would provide gross revenue sufficient to show a reasonable earning on the capital invested in the railway system. It is now estimated that a 10-cent fare is required in order to make the enterprise reasonably profitable.

Unfair jitney competition, together with wage increases granted by the board of arbitration last December without corresponding increased revenues, and the present high cost of materials, are the causes given for the poor showing. Following the filing of the petition the company made a statement in part as follows:

The company had invested in its railway business on Dec. 31, 1918, $1,601,510. The gross earnings for the first three months of this year amounted to $81,897, while the operating expenses for the same period were $75,879, leaving net earnings from operation of $5,651.

On this basis the railway earnings for the year would amount to $22,567, equivalent to only 1.49 per cent of the investment, without any allowance for depreciation of the property.

There are two reasons for this poor showing:

1. The loss of business resulting from jitney operation, and
2. The very large additional expense due to the increase in wages granted our employees in accordance with the award made by the Board of Arbitration appointed by the Governor in December last, and the greatly increased cost of all materials and supplies.

We estimate that in the event of our application being granted by the commission, there will be a decrease of about 25 per cent in the number of passengers carried due to the higher rates, according to the experience of companies elsewhere under similar conditions, and our net earnings for a full year operation on this basis would be $177,248 at the rate of 11.6 per cent on the capital now invested, without any provision being made for depreciation.

Every effort has been made by the company since the beginning of the war to cope with the rapid increase in the cost of operation by effecting economies wherever possible consistent with the service the public demanded, but the infringement on its earning capacity by the unfair jitney competition on one hand and the large increase in wages granted the men in December last without any provision being made for increased income to meet the increased wages, on the other hand, has placed the company in a position where it must have immediate relief in the form of increased fares applied for, failing which two courses are open, namely, to reduce the wages of men to the same rate that was in force prior to the arbitration award while at the same time materially curtailing the service (which course would not be satisfactory to the employees or the public), or suspend operations entirely.

Had the jitney competition been eliminated, it is quite possible that notwithstanding the greatly increased cost of operation, the company could have continued to operate at the present rate of fare and derive a fairly satisfactory return on its investment, but under existing conditions that is impossible.

## Spokane Increase Disappoints

According to figures compiled by Henry J. Bender, superintendent of public utilities in the office of Mayor Fassett, the financial troubles of the railways there have not improved with the increase in fare to 6 cents, which took effect early in April. While the revenues of the Washington Water Power Company from its city lines increased $1,263, or 6 per cent, during April, this did not meet the increase in wages made to the men on the strength of the advance in rates. The wage advance had been estimated to cost $4,000 a month. The company sustained a loss of 11½ per cent in travel.

The earnings of the city lines of the Spokane & Inland Empire Railroad increased $1,279, or 10 per cent, during April, while the loss of travel was only 4 per cent. The more favorable showing by this system is believed by Mr. Bender to be due to the longer hauls. He thinks the slump in travel was mostly in the short hauls. The traction company also increased the wages of its men 6 cents an hour at the time the increased fares went into operation.

When the question of the increase of 20 per cent in carfares was under consideration by the City Commissioners, the railway managers said that there would be a slump in travel but thought that the 6-cent fare would bring an increase of 15 to 16 per cent in revenues. The actual results of the first month's showing have been disappointing and have demonstrated the need for speedy action to improve conditions.

Waldo G. Paine, traffic manager of the Spokane & Inland Railroad, stated that there was some question in the minds of railway men as to whether a flat increase of fare was the proper remedy. He referred to the zone system as the alternative.

## Permanent Increase Denied

The Public Utility Commission of Maine has refused the application of the Lewiston, Augusta & Waterville Street Railway, Augusta, to make permanent the 7-cent fare adopted by the company in June, 1918, with the approval of the commission. The commission has, however, ordered that the schedule which has been in effect "be continued for one year from June 1, 1919, unless sooner canceled by the commission." The commission is "convinced from our examination of the accounts of the company, and from our general knowledge of conditions on this particular railway and on the electric railways generally throughout the State and throughout the country, that no reduction in fares is at present warranted." The commission commented as follows on the results so far obtained:

> The company at the hearing on May 21 this year presented a statement of its operating revenues and expenses for the years 1913, 1914, 1915, 1916, 1917 and 1918, and a detailed statement of its revenues and expenses by months from June, 1916, to May 1, 1919. This statement shows that while the revenues since June, 1918, have been materially greater (with the exception of one or two months) than they were in either of the other years, it also shows that the cost of operation has in most of the months outrun the increase in revenue. It has resulted in the necessity of the passing by the company of its dividends on preferred stock and since October, 1918, has resulted in a deficit each month—such deficit ranging from $1,751 in April of this year, up to nearly $20,000 in October, 1918, and it shows that for the calendar year of 1918 the deficit was $135,915 and that the deficit for the eleven months ending May 1, 1919, was $57,680.
>
> This latter deficit is, however, substantially less than for the same period a year previously, when the deficit was $81,759. While the statement is not entirely encouraging, it is not anywhere near as discouraging as were the conditions the company faced a year ago. But in spite of the better showing during the past year a substantial deficit still exists, and the company faces the proposition that wages will probably remain, for a time at least, at the present level and other costs of operation will not be materially lessened for a considerable period of time.

## Portland Company Wants Fare Increase

The application of the Portland (Me.) Railroad, included in the system of the Cumberland County Power & Light Company, for a 7-cent fare was formally presented to the Public Utility Commission of Maine on May 26 by A. H. Ford, vice-president and general manager, Mr. Ford in his petition stated that the Portland Railroad operated in 1918 with a deficit of $110,255, and that for the first four months of the current year the deficit has been $112,038.

It was further shown at the hearing that the 6-cent fare schedule has been operative for two months, and that there had been a substantial increase in gross passenger earnings, but that the company still fails of earning its operating expenses and rentals. Furthermore, expenditures for railroad improvements and municipal improvements which must be made this year will probably produce a heavy deficit for 1919.

Mr. Ford introduced a letter from Prof. Albert S. Richey supporting his contention. The following schedule of proposed changes drawn up by Professor Richey was also submitted to the commission:

> Mile zones, transfer limits, etc., to remain the same.
>
> Rate of fare—by ticket—2½ cents per mile.
>
> Rate of fare, if paid in cash—3 cents per mile.
>
> Minimum fare, by ticket—3 miles, 7 cents.
>
> Minimum fare, by cash—3 miles, 9 cents.
>
> Transfer privileges as at present.

Professor Richey suggests that while the new schedule appears unequal to furnishing the total revenue needed, relief through legislation from unjust burdens as to paving, taxation, etc., would meet the balance of deficits as now appear inevitable.

It is proposed to charge 2½ cents per mile by ticket or 3 cents per mile for cash fares, with a minimum fare of 7 cents by ticket and 9 cents by cash. It is estimated that an increase of 10.15 per cent in revenue of the company will follow the introduction of the new schedule.

## California Interurban Wants More

The Oakland, Antioch & Eastern Railway, Oakland, Cal., has filed with the Railroad Commission an application for authority to increase its passenger fares on its commercial line between Oakland and Sacramento. The petition says the increased fares asked for are mainly between points competitive with the United States Railroad Administration lines, and are in all but a few instances the same and in no cases higher. The increase in rates is necessary, according to the company, because of the increase in cost of operation and because the revenue is insufficient to pay operating charges and a reasonable return upon investment. Comparative proposed and present rates follow:

| Between | (One-way Fares)<br>Proposed | Present |
|---|---|---|
| San Francisco and Sacramento | $2.70 | $2 50 |
| Oakland and Sacramento..... | 2.55 | 2.50 |
| Oakland and Antioch......... | 1.45 | 1.35 |
| Oakland and Bay Point...... | 1.10 | 1.00 |
| Bay Point and Canyon....... | 0.80 | 0.70 |
| Bay Point and Pinehurst..... | 0.75 | 0.65 |
| Bay Point and Moraga....... | 0.65 | 0.60 |

The company asks for a round-trip week-end fare between San Francisco and Sacramento of $3.60 instead of the present rate of $3.35 and a round-trip week-end fare between Oakland and Antioch of $2.25.

## Fairmont Company Gets Increase

The Public Service Commission of West Virginia handed down a decision on May 27 granting the Monongahela Valley Traction Company, Fairmont, W. Va., a uniform 7-cent fare on all city lines and on all zones of the interurban lines. The company operates about 150 miles of track. In addition to the fare increase the commission established a new schedule of power rates giving an average increase of approximately 20 per cent.

The new rate affects principally the cities of Fairmont and Clarksburg. The increases in passenger rates were from 5 to 7 cents in the cities, and from 6 to 7 cents on the interurban line, except between Fairmont and Barrackville. Increase between these places was protested and the commission will further investigate regarding it.

An extensive publicity campaign, conducted by Glenn Marston, New York, was of material assistance in enabling the company to secure increased fares.

The publicity campaign was for the purpose of making clear to the general public the necessity of increased rates if the property was to be maintained in first-class condition. Much of the company's property is situated in the heart of the West Virginia coal fields, and the employees of the coal companies have secured large wage increases since 1914. They were quick to realize the increased costs to which the railway was subject. There were only two protests to the commission during the legal period preceding the hearing. Both of these were withdrawn when the conditions were made clear. The absence of protests is attributed to the efficacy of the publicity campaign, which went thoroughly into all phases of operating conditions and showed wherein the company was subject to the same increases in living cost as the private citizen. The company was represented by George M. Alexander, president.

## New York Commissions Urged to Act

Joseph K. Choate, chairman of the committee on ways and means to obtain additional revenue for the New York State Electric Railways, on June 5 sent a letter to Chairman Lewis F. Nixon of the Public Service Commission of the First District of New York, and F. R. Hill of the Second District, enclosing copies of correspondence between himself and Governor Smith relative to an investigation of the electric railway situation in New York State, and urged upon the two commissions that following the suggestion of Governor Smith they institute an investigation of the traction situation in both the first and second districts with a view to making recommendations for corrective and remedial legislation at the next session of the Legislature.

Mr. Choate's letter was written at the suggestion of the Governor, who had been previously requested, by Mr. Choate, in behalf of the committee, to appoint a committee of citizens for the same purpose.

# Transportation News Notes

**Wants Six Cents in Ashtabula.**—The shtabula (Ohio) Rapid Transit Comany has asked the City Council of Ashabula for a new franchise which will rovide for a 6-cent fare. Some months go the company asked for a 7-cent are. This was refused.

**Six-Cent Fare Continued.**—The 6-ent fare of the United Railways, St. ouis, Mo., was continued in effect for ixty days by order of the Public Serve Commission of Missouri on May 29 o give City Counselor Daues of St. ouis an opportunity to study the finncial exhibits of the railway. Mr. aues did not oppose the temporary ntinuance of the 6-cent fare. At the nd of the sixty-day period the comission will set a date for a hearing on e general subject of railway rates in t. Louis.

**Fare Prospects Brighter.**—The hearg of the application of the Topeka Kan.) Railway for an increase in fare 6 cents will be held by the Public tilities Commission on June 10. On previous application the commission nied the increase. Speaking informly, a member of the commission is reported to have said that there was no doubt that railway expenses had increased materially and that the Topeka Railway would have a chance to prove its financial condition.

**Canton-Massillon Fare Controversy.**—It is believed the Northern Ohio Traction & Light Company, Akron, Ohio, will not accept the franchise prepared by the Stark County Commissioners for the line between Canton and Massillon, Ohio, as long as it contains a provision fixing the rate of fare. The company has asked for another conference with the commissioners for the purpose of adjusting the fare question. The rate incorporated in the draft is 10 cents.

**Jitneys Want Seven Cents.**—The members of the Long Branch (N. J.) Auto Bus Association have threatened to stop operating their machines unless the City Commission passes a 7-cent fare ordinance or moves to repeal the ordinance under which bonds may be given. Some of the jitney drivers say they have to mortgage their cars to raise the premium on the bonds. The drivers say the public is willing to pay the higher fare. The business men of Long Branch have petitioned the City Commission to repeal the bond ordinance.

**Akron Would Enforce Service Requirement.**—A resolution has been introduced in the City Council at Akron, Ohio, to appoint a committee of four to employ counsel to take action against the Northern Ohio Traction & Light Company to enforce the clause in the present franchise which provides for adequate service. Under the resolution engineers and accountants may be employed to investigate the service. As a means of enforcing the requirement the resolution provides for the reduction of the jitney license fee from $25 to $2 a year in order to increase the jitney service.

**One-Mile City Line Asks Increase.**—Application has been filed with the Public Service Commission for the First District of New York by the Van Brunt Street & Erie Basin Railroad for permission to increase its rate of fare from 3 cents to 4 cents. The distance traversed by the line, from Hamilton Ferry to the Erie Basin, is a trifle more than 1 mile. The company buys its power from the Brooklyn Rapid Transit Company. The application says the wages of its employees have been increased from $3 to $3.60 a day, that there soon will be a further increase to the standard wage of $4.10, and that the Broklyn Rapid Transit Company has raised the price of electric current.

**Freight and Express Service in Kansas City.**—A freight and express service over the lines of the city is contemplated by the Kansas City (Mo.) Railways. Already the company is hauling rock and other building materials for contractors, and contracts for hauling paving materials to contractors building streets near car lines probably will be made by the company. The freight business will be handled so as not to interfere with passenger traffic, and much of it will be hauled at night. Another source of revenue to the company is expected to develop through an express system. The plans are now being worked out. The express cars will handle crosstown shipments to district stations.

**Slight Fare Reduction in Cleveland.**—Fares on the lines of the Cleveland (Ohio) Railway will be reduced to eleven tickets for 50 cents with a 1-cent charge for transfers, starting on July 1. The present fare is 5 cents with a 1-cent charge for transfers. Announcement of the change in fare was made by Street Railway Commissioner Fielder Sanders after receiving the report of the earnings and expenses of the Cleveland Railway for April. This report showed that the interest fund, the fare barometer, climbed $205,468 in April, making the total interest fund on May 1 $568,700. When the fund reaches $700,000 the fare goes down. Indications for May were that the fund would climb above the $700,000 mark.

**Obtaining Local Consents First.**—The villages of Port Chester and Rye have agreed to an increased fare on the lines of the New York & Stamford Railway, which operates between New Rochelle, N. Y., and Stamford, Conn. The towns of Rye, Harrison and Mamaroneck, and the villages of Mamaroneck and Larchmont have not taken action. The company seeks approval before putting the case for an increased fare before the Public Service Commission. Under the new arrangement, a 5-cent fare will give a ride within the village limits, but another fare must be paid after the line is crossed. Free transfers from the main line to local lines or vice versa are eliminated. Three cents will be charged for transfers.

**Basis of Kingston Increase.**—The Public Service Commission for the Second District of New York recently authorized the Kingston (N. Y.) Consolidated Railroad to put a 6-cent fare into effect for a period of one year from April 15. The company operates a street surface railroad about 8 miles in length in the city of Kingston. The basis of the complaint in a general way was the large increase in operating costs caused by the war. It is interesting to note that while the petition in this case was filed in June, 1917, the only ground on which an increase could possibly be considered was the estimated figures for the year 1919. The local authorities appeared and formally objected to the proposed increase, but did not cross-examine the petitioner's witnesses or introduce any evidence, the Mayor stating for the record that if a *prima facie* case were made the city would be satisfied with the determination of the commission increasing the fare.

# Personal Mention

## French Electric Railway Commission Here

### Its Members Are Studying American Electrification Practice in Numerous Cities

An official commission of French electric railway engineers, interested in railway electrification, is visting this country. The commission is made up of the following members: Chairman, Professor Mauduit, professor of electrical engineering, Nancy University; Major D'Anglards, official representative, Minister of Public Works; and Messrs. Balling, chief engineer; Parodi, chief electrical engineer, and Sabouret, assistant manager, Paris-Orleans Railway; Japiot, chief mechanical engineer, and Ferrand, electrical engineer, Paris, Lyons & Mediterranean Railway; Debray, electrical engineer, and Barilliot, electrical engineer, French State Railway; Bachellery, assistant manager, and Leboucher, assistant motive power superintendent, Midi Railway.

The commission has made an inspection of the various properties around New York, and has visited among other cities New Haven, Schenectady, Philadelphia, Washington, Bluefields, Altoona, Pittsburgh, Erie and Chicago. It is in the last named city that the commission has been this past week. The Chicago, Milwaukee & St. Paul Railway electrification will be visited before the party returns East.

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**C. E. Martin**, formerly auditor of the Pittsburgh, Harmony, Butler & New Castle Railway and the Pittsburgh, Mars & Butler Railway, Pittsburgh, Pa., has been appointed secretary and treasurer succeeding P. E. Seddon, resigned.

**J. R. Perkins** has been named as assistant to J. S. Pevear, general manager of the Birmingham Railway, Light & Power Company, Birmingham, Ala. Mr. Perkins is an engineer and an expert operating man. He has been connected with the operating department of the American Cities Company since 1913.

**Anton G. Hodenpyl** has retired from the presidency of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., on account of ill health. He will be succeeded by George E. Hardy, vice-president of the company. Mr. Hodenpyl has been president of the company since its organization about ten years ago. He will remain a member of the board of directors.

**J. M. McElroy**, general manager of the Manchester (England) Corporation Tramways, who has been spending a considerable period at Torquay, the noted seaside resort, has now fully recovered and is back in Manchester. This will be good news to those who had the pleasure of meeting Mr. McElroy when he visited this country some time ago to study American operating practices with a view toward relieving traffic congestion at Manchester.

**Clarence K. Reed** has been appointed general auditor of the Boston (Mass.) Elevated Railway. Mr. Reed is a native of Boston. He has been in the employ of the Boston company since 1902. Previous to that he was engaged for a short time in commercial activities. He began railway work at Boston as invoice clerk in the auditing department and has successively filled every post in the department of which he is now the head. Mr. Reed is at present a member of the New England Street Railway Club committee on electric railway mail compensation, and is actively preparing for the hearing to be held at Boston on this matter on June 13 by the Interstate Commerce Commission.

**George M. Wood** has been appointed supervisor of power plants for the Connecticut Company, New Haven, Conn. Mr. Wood has been connected with the Connecticut Company in the power department for a period of eight years, first serving for two years as draftsman and later being connected particularly with erecting jobs on the company's power plants and heating systems. In 1913 he was made assistant engineer in the operating department and in 1915 was transferred to the construction department. Mr. Wood is a native of the town of Branford, near New Haven, where he still resides. He was graduated from the Sheffield Scientific School of Yale University, in 1908, from which he holds the degree of Ph. B.

**Robert L. Norton**, publicity manager of the Boston (Mass.) Elevated Railway, has resigned to become Washington correspondent of the Boston *Post*, Mr. Norton was formerly political editor of the *Post*, and succeeded J. Harvey White in the Boston Elevated organization upon the latter's resignation several months ago. Mr. Norton left for Washington on May 21 to open an office at that city, the *Post* having never been directly represented among Washington correspondents until now. In his few months tenure of office on the Boston Elevated, Mr. Norton made many friends and performed excellent service in co-ordinating local newspaper interest in the operation of the elevated railway by its public trustees and the publicity requirements of the latter work.

**W. J. Grambs**, after almost two years service for the government in the recruiting service of the United States Shipping Board, has returned to private life, and will devote his time to the office of manager of auxiliary operations of the Puget Sound Traction, Light & Power Company, Seattle, Wash. Mr. Grambs tendered his resignation as supervisor of the recruiting service to take effect on May 1, but was requested to continue in charge until June 1. Mr. Grambs was appointed section chief for the Pacific Northwest in August, 1917, in charge of the government free navigation and engineering schools for the training of deck and engineer officers. In May, 1918, he was appointed supervisor of the sea training bureau of the United States Shipping Board in the Northwest.

**H. H. Crowell**, a vice-president of the Michigan Railway and the Consumers' Power Company, who has represented the Commonwealth Power, Railway & Light Company interests for the last eight years, has been elected a vice-president of the Electric Bond & Share Company, New York, N. Y., to fill the vacancy recently created by the death of George E. Claflin. Mr. Crowell has been identified with the electrical industry since 1889, when he entered the service of the Thomson-Houston Electric Company. Later he was New York State agent of the Thomson-Houston Motor Company and assistant New York State manager of the Thomson-Houston Electric Company, until the organization of the General Electric Company, in 1893. He was manager of the Syracuse and Buffalo offices of the General Electric Company until 1906 when he became chief engineer of the Commission of Gas and Electricity of New York State and later of the Public Service Commission for the Second District. Since 1911 he has been with the Commonwealth Power, Railway & Light Company properties in Michigan. Mr. Crowell is a member of the national committee of public utility conditions, which has represented the public utilities in Washington during the war.

**A. G. Carson**, now manager of the Manitowoc & Northern Traction Company, Manitowoc, Wis., and also of the business of the Wisconsin Public Service Company in Manitowoc and Two Rivers, including the Manitowoc steam station, has had his field of operations extended by the additional appointment as general superintendent of the Wisconsin Public Service Company, Green Bay, Wis. This appointment adds to his present duties the supervision of the electric light and power department and the railway department of the Public Service Company at Green Bay, reporting directly to C. R. Phenicie, vice-president and general manager. Mr. Carson will divide his time between Manitowoc, Two Rivers and Green Bay, taking charge of the railway department and the electric light and power department at Green Bay at once, thus becoming principal assistant to Mr. Phenicie, who, through the relief afforded by Mr. Carson will be able to spend more of his time at Manitowoc and Two Rivers. Mr. Carson was born in Michigan thirty-three years ago. Before coming to Manitowoc he was superintendent of the Eastern Wisconsin Electric Company, Fond du Lac. He was chief engineer of the Wisconsin Electric Railway and the Eastern Wisconsin Electric Railway & Light Company, Oshkosh, for several years when J. P. Pulliam was general manager and Clement C. Smith president of those companies. The assignment of a larger field of work to Mr. Carson is in recognition of his long and efficient service with the organization.

**Leake Carraway**, who for some time has been in charge of publicity work for the Southern Public Utilities Company at Charlotte, N. C., has severed his relations with the company to become publicity director in charge of public relations for the Virginia Railway & Power Company. He will handle the company's affairs in Norfolk, Berkley, Portsmouth, and Newport News. He will report directly to President T. S. Wheelwright at Richmond. Mr. Carraway went to Charlotte in 1911 as a free ance on the Charlotte *News* from the Arkansas *Democrat* the largest afternoon paper in that State, of which he was editor-in-chief. A year later he was elected secretary of the Greater Charlotte Club and during his term as ecretary took active part in a number f civic improvements, among them be- ng the installation of the White Way n Trade and Tryon Streets and also n the putting in of the under pass on ast Trade Street. Since his connection with the Southern Public Utilities Company, he has taken a very active inter- st in newspaper work outside of his egular duties, "covering" many big ories for the papers and keeping in timate contact with the newspaper en of Charlotte to whom he has been a friend in need" many times. He has ways maintained a policy of frank- ess with the newspapers and has built a spirit of understanding between s company and the citizens. To be act, Mr. Carraway entered upon his ties at Charlotte five years ago. He as one of the first men regularly em- oyed in work of the kind, and so r as the South is concerned he was a oneer. He edited the company's onthly magazine, which was both in- rmative and inspiring. The Char- te *Daily News* regards his going a distinct loss to that city and the her communities which the company ved, for as it says "Mr. Carraway s served to strengthen the ties that st between employer and employee" "has aided in no small measure in creation of a feeling of sympathy co-operation between these two tors within the organization. The ults of his work at Charlotte have n the subject of comment in the ECTRIC RAILWAY JOURNAL.

# Obituary

## Jesse W. Lilienthal Dead

**President of City Electric Railway at San Francisco Dies Suddenly While at Luncheon**

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., dropped dead of apoplexy in the midst of a luncheon address at the St. Francis Hotel, San Francisco, on June 3.

When the United Railroads became involved in financial tangles and, worse still, had incurred the opprobrium of the public, it was determined that a new leader must be found to fill the president's chair and rehabilitate the affairs of the company. Mr. Lilienthal was urged to undertake this work, and although he had an aversion to politics he was induced to accept this commission as an opportunity to accomplish a great work. In order to give his attention to affairs of the railways he had to relinquish much of his share in activities of the law firm of Lilienthal, Raymond & McKinstry, of which he had been the senior member for many years. Under his leadership the United Railroads made very considerable progress in gaining public esteem, and the policy of this company on the subject of public relations has become known the country over.

Mr. Lilienthal personally conducted the negotiations with San Francisco city authorities on the questions of conflict with municipal railway rights and the purchase of the United Railroads by the city.

Mr. Lilienthal was born in 1855 in New York City. While still a young man his family removed to Cincinnati, Ohio, where he received the greater part of his primary education. Finishing his course in the public schools, Mr. Lilienthal entered the University of Cincinnati, from which institution he transferred to the Harvard Law School, receiving his degree there in 1876.

Mr. Lilienthal's career as a lawyer began in New York City, where he practiced for a period of fourteen years after his graduation from college. Owing to the ill health of his wife he moved to San Francisco in 1894. Since then he has been a moving factor in the business life of that city.

Among his other interests, Mr. Lilienthal was a director of the Oakland, Antioch & Eastern Railway and was a director or in other ways active in ten or twelve other organizations in the San Francisco Bay region. He was president of the Society for the Study of the Exceptional Child and had been appointed by the Judge of the Superior Court to membership of the probation committee of the Juvenile Court.

It is stated that Mr. Lilienthal's death will not have any effect upon the plans for the financial readjustment of the United Railroads, announcement of which is expected to be made shortly after a study of many months.

**W. E. Blake**, superintendent of the Underground Electric Railways, London, England, died on May 8 following an operation. Mr. Blake, a few weeks previously, was directing the removal of a car when he slipped and received a slight injury to his leg. Septic poisoning resulted and it was necessary to amputate the limb. Mr. Blake, who was fifty-five years of age, was unable to survive the shock of the operation. Those who knew this jovial, generous and hard-working operator will extend their condolences not only to his family but to every one whose daily association with him made a pleasure out of their daily task. Some of Mr. Blake's work with the Underground Electric Railways will be referred to in one of the forthcoming articles on British electric railway practice.

**Charles Whitman Wetmore**, formerly for many years president of the North American Company, New York, N. Y., which controls the electric railways in Milwaukee, St. Louis and other cities, died on June 2 at his summer home in the sixty-fifth year of his age. Mr. Wetmore was born in Michigan. He was educated there and at Harvard, and was graduated from the law school in 1877. After graduation Mr. Wetmore went to New York and began the practice of law with the firm of Barlow & Olney, which afterward became Barlow & Wetmore. In addition to his connection with the North American Company Mr. Wetmore was one of the organizers of the Montana Power Company. About five years ago he retired from active business and lived in Surrey, England, until the war broke out, when he returned to the United States and took up his residence in Washington.

**George T. Hanchett**, consulting electrical and mechanical engineer of New York City, died at the Battle Creek Sanitarium on May 6. Mr. Hanchett, who was born at Hyde Park, Mass., Sept. 4, 1871, was a gradute of the Massachusetts Institute of Technology. In 1895 Mr. Hanchett joined the editorial staff of the *Electrical World* and later, after he had opened an office as consulting electrical engineer in New York, became a frequent contributor to the ELECTRIC RAILWAY JOURNAL. In 1900 he published a book entitled "Electric Railway Motors," containing in part articles on this subject which he had written for this paper. Other work which he did in the electric railway field was the invention, with F. B. Sage, of a direct reading ohmmeter, and the perfection and installation of a sectional third-rail system in the Belt Line tunnel of the Baltimore & Ohio Railroad. Mr. Hanchett suffered a stroke of apoplexy a year ago, and the recurrence of that trouble is given as the immediate cause of his death. He was a Fellow of the American Institute of Electrical Engineers.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Better Purchasing of Trolley Wheels

### One Manufacturer Reports Volume of Sales This Year Running 33 Per Cent Ahead of Last Year

From all appearances there is a returning confidence among purchasers of some railway material. In the case of trolley wheels and harps there have been found instances where the orders have taken on a rather normal size.

There is without doubt sufficient purchasing to keep the overhead current collectors in operating shape, but when a manufacturer states that he believes railway people are buying these parts of equipment in quantities beyond their immediate requirements, there is added hope in the market.

One Eastern company just ordered 1000 trolley wheels, and other smaller size orders have come to notice. One manufacturer's sales to date are ahead of last year's sales for the corresponding period about 33 per cent. With this in mind it hardly seems that prices will have to be guaranteed to stimulate buying. With rising copper there has been found no intention on the part of manufacturers of copper and brass goods to guarantee any prices.

Some of the large railways are purchasing in better quantities than in the past two years, and are ordering with the prices open. This, it seems, shows the trend of thought regarding present prices where the financial conditions of the road permits of buying.

There are no indications that prices will be lower. In fact, with the higher price of copper it seems more likely that collectors will reach higher price levels before there will be any indications of a recession.

## Cotton Advance Sends Bell Cord Higher

### Prices Are Up Four and Five Cents a Pound, with Further Increase Anticipated

The rise in price of raw cotton, which took effect about two weeks ago, has left its mark on the price of woven cord for bell ropes and register cords. This product has been found up 4 to 5 cents a pound over the price of two weeks ago. It cannot be said, however, that the demand for cord for these purposes has materially increased, as merely sufficient quantities are being purchased by traction companies to keep their cars equipped. No evidence has been found where any amount of cord has been purchased for stock.

With the signing of the peace treaty it is expected that exporting of cotton will set in in great volume. The present cotton yield is only about 75 per cent of normal, it is stated, so it is reasonable to expect that the heavy foreign demand with the curtailed supply will result in much higher prices. One manufacturer of cord stated that he would not be surprised to see cotton rise to a price level of 50 or 60 cents a pound.

It is not improbable that bell cord will go higher as it is practically the same cord as is used for window weights. The resumption of building in large volume will undoubtedly have its effect on this market with the result of higher prices.

Manufacturing conditions are somewhat better than a few months ago. Although labor is not found any more efficient or any lower in price, it is easier to procure. For the present there is reported sufficient raw material on hand to satisfy present needs.

## Copper and Brass Products to Reach a Higher Level

### Gradual Advances Expected to Bring Rubber-Covered Wire Up to 25 Cents or Better in the Fall

Within the past month buyers have seen copper products such as wires and brasses advance on a rise of a little more than 1 cent in the copper market. Indications are that this is but the first of a series of rises to last well into the fall months.

In spite of the fact that there are immense stores of copper available, current quotations may be considered as a bottom level. Current prices are not to be taken as any indication of the relation between supply and demand. Psychology rather than the old laws of economics govern the present market.

Copper has been steady now for a couple of weeks. Just as soon, however, as any consumer demand develops prices will advance again, and they will continue to advance just as long as buying continues. When buying begins to ease up price will be stationary. There is no indication that a slump in buying will be accompanied by a falling market.

Advances will probably be made in steps of about 1 cent at a time. The upper limit which should occur in the fall is expected by those in a position to forecast more or less accurately to reach and perhaps exceed 20 cents. That would put rubber-covered wire on a 25-cent base or higher.

## Condition of Market for Car Seatings

### Demand Better for Repairs, but New Work Is Dull—Supply of Rattan Is Better

The activity in the car seat market is not pronounced. The small number of new city and interurban cars where plush or imitation leather might be used has kept that end of the market dull. The one-man type of car which is coming quite generally into vogue now employs any one of a variety of seat coverings and materials, so that with only a rather light car market anyway, the business created for each kind of material is light. There has been found a better market in repairs, but this in itself is indeed light enough.

The use of waterproofed veneers for car seats has been reported to be in slightly better demand. It was found necessary during the influenza epidemic to leave windows open, and during inclement weather some veneer seats became wet and warped. Slats are rather giving way to veneers on account of their excess weight.

The supply of rattan is coming through from the Orient now in better shape than during the war. No reduction in cost is anticipated so long as freight rates continue high and the Oriental laborers receive a higher wage. There has also been reported a shortage in cargo ships.

## Steel Poles Find Good Foreign Demand

### Exports of Expanded Type Have Grown in Spite of War—Domestic Business Continues Good

According to A. J. Bates, president Bates Expanded Steel Truss Company, export of the company's steel poles for electric railway service has grown during the last four years in spite of the handicaps set up by the war.

Among the first foreign customers was the Swedish State Railways, which bought these poles for the famous Kiruna-Riksgränsen line—the only electrification within the Arctic Circle! The results on that line have been so satisfactory that the Norwegian State Railways has made the same pole standard for the forthcoming 45-mile electrification between Christiania and Drammen. From Italy, the demand became so insistent that an Italian company, Società Anonima Italiana Expansione Ferro Bates, has been organized, with headquarters at 2 Salita del Carmine, Genoa. The machinery for this company has already been shipped. Negotiations are now under way for the formation of a British company.

Still more remarkable are the war-time shipments to such remote spots as Johannesburg, South Africa, and Bombay, India. Through Charles T. Stork & Company, New York, an order came for electrification material for Soerabaya, Java, while Colin S. Douglass of Sydney, New South Wales, has secured orders from properties like Perth, West Australia; Adelaide, South Australia; Sydney, New South Wales, and Hobart, Tasmania. A good domestic business also has been done.

## More Manufacturing in Pacific Coast Shops

### Jobbers Carry Smaller Stocks in Far West, but Manufacturers Are Increasing Supplies

Electric railways of the Pacific Coast during the war learned to use their own shops for manufacturing far more extensively than ever before. Not only high prices, but delays in deliveries or even the difficulty of getting orders filled at all, made it necessary to turn the repair shop into a factory wherever possible. This was in keeping, too, with the policy that a higher degree of efficiency must prevail in maintenance work. The junk pile on hand was resorted to and nothing was added to it which could, by repair and reconstruction, be made to serve a purpose somewhere.

Trolley poles worth $2.60 in 1915 cost $4.25 last November and $4 now. In face of the difficulty in getting funds for any purchases whatever, trolley poles that would formerly have been scrapped as damaged beyond repair are now carefully rebuilt. Not only does this avoid the higher price but it keeps the cost in the shop account which ordinarily can be defended more readily than can the purchase of new equipment. Four-inch trolley wheels that sold for 68 cents in 1915 were worth $1.40 last November and sell for $1.35 now.

Fearing a drop in prices some jobbers and manufacturers' agents are carrying light stocks. Where the normal stock used to be twenty-five track jacks, for example, ten are now carried. On most lines (excepting supplies) the manufacturer has given the agent a price change protection up to July 1. In some lines, say about 25 per cent, this protection extends to next January. Manufacturers, on the other hand, are generally carrying heavier stocks than before the war with the idea of giving better service and while there is practically no movement at the present time there is an optimistic feeling that the electric railways are here to stay, that profitable freight business is in sight for the interurbans and that conditions must improve.

The probability of price reductions is considered unlikely until labor costs and taxes decrease. There has been some slight drop in prices but in the main they are steady and not considered likely to decrease. Changes in the value of copper alone have not and cannot materially affect this condition.

## Rolling Stock

**Berkshire Street Railway, Pittsfield, Mass.**, it is announced, has sold ten large open-type cars, which are being shipped to Knoxville, Tenn.

**Kansas City (Mo.) Railways**, it is reported, has placed in service on the Westport line ten safety cars. This completes the twenty-five safety cars, the equipment of which was given in these columns on April 5. An order was recently placed with the American Car Company for five more.

## Track and Roadway

**Kansas City (Kan.) Railways.**—New car line extensions in Kansas City, Kan., are being contemplated by the Kansas City Railways. It is planned to extend the Eighteenth Street line from Central Avenue south to Kansas Avenue. A new line will be built on Seventh Street from Central Avenue, south to connect with the Seventh Street viaduct, and in this event the Wyandotte line on Fifth Street from Riverview south to the Seventh Street viaduct probably would be abolished. The plans also contemplate the changing of the Sixth Street tracks from the private right-of-way at Riverview, to Sixth Street proper between Central Avenue, north to Riverview Avenue, where the present north and south line now connects with Sixth Street.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.**—The Board

## NEW YORK METAL MARKET PRICES

| | May 15 | June 5 |
|---|---|---|
| opper, ingots, cents per lb | 16.00 | 16 62½ |
| opper wire base, cents per lb | 17.25 to 18 00 | 18 25 to 18 75 |
| ead, cents per lb | 5 00 | 5 25 |
| ickel, cents per lb | 40.00 | 40.00 |
| pelter, cents per lb | 6 40 | 6 47½ |
| in, cents per lb | †72.50 | †72.50 |
| luminum, 98 to 99 per cent, cents per lb | 31.00 to 33.00 | 32 00 to 33.00 |

† Government price in 25-ton lots or more f.o.b. plant.

## OLD METAL PRICES—NEW YORK

| | May 15 | June 5 |
|---|---|---|
| Heavy copper, cents per lb | 13 50 to 14 00 | 14 50 to 14 75 |
| Light copper, cents per lb | 11 00 to 11.25 | 11 75 to 12 50 |
| Heavy brass, cents per lb | 7 50 to 8 00 | 8 00 to 8.50 |
| Zinc, cents per lb | 5 00 to 5 25 | 5 00 to 5 50 |
| Yellow brass, cents per lb | 6 50 to 7 00 | 7 25 to 7 75 |
| Lead, heavy, cents per lb | 4 25 to 4 37½ | 4 50 to 4 60 |
| Steel car axles, Chicago, per net ton | $23 00 to $24 00 | $23 00 to $24 00 |
| Old carwheels, Chicago, per gross ton | $21 00 to $22 00 | $21 00 to $22 00 |
| Steel rails (scrap), Chicago, per gross ton | $16 50 to $17 00 | $16 50 to $17 00 |
| Steel rails (relaying), Chicago, gross ton | $16 50 to $17 00 | $16 50 to $17.00 |
| Machine shop turnings, Chicago, net ton | $6 00 to $6 50 | $6 00 to $6 50 |

## ELECTRIC RAILWAY MATERIAL PRICES

| | May 15 | June 5 |
|---|---|---|
| ubber-covered wire base, New York, cents per lb | 20 | 21 |
| eatherproof wire (100 lb. lots), cents per lb., New York | 23.00 to 23.25 | 23.25 to 24.00 |
| eatherproof wire (100 lb. lots), cents per lb., Chicago | 23.75 to 37.35 | 24 50 to 24 75 |
| rails (A. S. C. E. standard), per gross ton | $49.00 to $51 00 | 49.00 to 51.00 |
| rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton | $47.00 to $49 00 | 47.00 to 49.00 |
| rails (A. S. C. E. standard), 500 ton lots, per gross ton | $45.00 to $47.00 | 45.00 to 47.00 |
| rail, high (Shanghai), cents per lb | 3 | [illegible] |
| ils, girder (grooved), cents per lb | 3 75 | 3.75 |
| ire nails, Pittsburgh, cents per lb | 3.25 | 3.25 |
| ilroad spikes, drive, Pittsburgh base, cents per lb | 3 35 | 3 35 |
| ilroad spikes, screw, Pittsburgh base, cents per lb | [illegible] | 8 |
| e plates (flat type), cents per lb | 2.75 | 2 75 |
| e plates (brace type), cents per lb | 2.75 | 2 75 |
| e rods, Pittsburgh base, cents per lb. | 7 | 7 |
| sh plates, cents per lb | 3 | 3 |
| gle plates, cents per lb | 3.90 | 3.90 |
| gle bars, cents per lb | 3.90 | 3.90 |
| il bolts and nuts, Pittsburgh base, cents per lb | 4 35 | 4.35 |
| el bars, Pittsburgh, cents per lb | 2 35 | 2.35 |
| eet iron, black (24 gage), Pittsburgh, cents per lb | 4 20 | 4.20 |
| eet iron, galvanized (24 gage), Pittsburgh, cents per lb | 5.25 | 5.25 |
| lvanized barbed wire, Pittsburgh, cents per lb | 4.10 | 4.10 |
| Galvanized wire, ordinary, Pittsburgh, cents per lb | 3.70 | 3.70 |
| Car window glass (single strength), first three brackets, A quality, New York, discount † | 80% | 80% |
| Car window glass (single strength, first three brackets, B quality), New York, discount | 80% | 80% |
| Car window glass (double strength, all sizes AA quality), New York discount | 81% | 81% |
| Waste, wool (according to grade), cents per lb | 14 to 17 | 14 to 17 |
| Waste, cotton (100 lb. bale), cents per lb. | 8 to 12½ | 8 to 12½ |
| Asphalt, hot (150 tons minimum), per ton delivered | ..... | ..... |
| Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton | ...... | ... |
| Asphalt filler, per ton | $30.00 | $30.00 |
| Cement (carload lots), New York, per bbl | $2.90 | $2.90 |
| Cement (carload lots), Chicago, per bbl. | $3.05 | $3.05 |
| Cement (carload lots), Seattle, per bbl. | $3.13 | $3.13 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal | $1.59 | $1.66 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal | $1.61 | $1.68 |
| White lead (100 lb. keg), New York, cents per lb | 13 | 13 |
| Turpentine (bbl. lots), New York, cents per gal | 78 | 94 |

† These prices are f. o. b. works, with boxing charges extra.

of Public Utility Commissioners of New Jersey has modified its recent demand that the Trenton & Mercer County Traction Corporation make immediate temporary repairs to the road at a cost of $3,300 and agrees to President Rankin Johnson's plan to more permanently improve the system at a cost of $55,000, if allowed a period of two years to make the changes. The board orders certain necessary repairs to the trackage be made at once and that these repairs be maintained in good condition by the use of a track welder.

**Interborough Rapid Transit Company, New York, N. Y.**—The work of constructing the elevated portion of the Pelham Bay Park branch of the Lexington Avenue subway from Whitlock Avenue to Pelham Bay Park has been started, following the execution of a contract between the City of New York as represented by the Public Service Commission for the First District and Terry & Tench Company, Inc., whose bid price for the work was $586,700. The column foundations upon which the elevated structure will be constructed are already completed, so that the erection of the steel may progress at once. It is hoped to have practically all of the elevated construction completed by the end of the year, and a large part in service.

**Cincinnati (Ohio) Traction Company**—In a recent letter to Street Railway Director W. C. Culkins, Walter Draper, president of the Cincinnati Traction Company, states that most important changes in engineering structures along the routes of the system, involving the reconstruction of the Ida Street bridge and the bridge over the Canal at Ludlow Avenue and the reconstruction of various inclined planes, with the possibility of the abandonment of the Bellevue plane, will be made necessary by the substitution of new double-truck cars for single-truck cars on a number of lines.

## Power Houses, Shops and Buildings

**Southwestern Gas & Electric Company, Texarkana, Ark.**—The Southwestern Gas & Electric Company will construct a repair shop, blacksmith shop, carpenter shop, paint shop, machine shop, woodworking shops, storage room and carhouse, all of fireproof construction. The cost will be about $60,000.

**Pacific Gas & Electric Company, San Francisco, Cal.**—Plans are being made by the Pacific Gas & Electric Company for the early resumption of work in connection with the establishment of a hydro-electric power plant in the Big Bend of the Pit River with extensive power development in this district. The project is estimated to cost about $12,000,000.

**Chicago, Milwaukee & St. Paul Railroad, Chicago, Ill.**—The 100,000-volt transmission line built by the Inter-mountain Power Company from the Washington water power plant at Long Lake, Wash., to Taunton, the first station west of Othello, Wash., was recently completed at a cost of $550,000. It is one link of the line to supply power for electrification of the Chicago, Milwaukee & St. Paul Railroad from Othello west to the Coast. The Chicago, Milwaukee & St. Paul Railway is building the transmission line from Taunton to Tacoma. Only a 17-mile gap between Beverly and Ellensburg remains. The line will be completed by the middle of next month. Electrification of one division of the railway, from Tacoma to Cle Elum, is expected to be completed between July 1 and 10. Between Cle Elum and Othello the work is partly done and will be finished in several months. Two divisions, between Avery, Idaho and Othello, are to be electrified later.

**New Orleans Railway & Light Company, New Orleans, La.**—For the purpose of facilitating current repairs and running maintenance, the New Orleans Railway & Light Company is installing additional machinery at a cost of $8,000 in the Magazine Street shop. The equipment consists of a new and larger acetylene welder, a large lathe and a radial drill.

## Trade Notes

**Railway Audit & Inspection Company, Philadelphia, Pa.**, has opened a Boston office in Rooms 546-547 Little Building. H. G. Hathaway is in charge.

**The Lincoln Bonding Company, Cleveland, Ohio**, has opened a Chicago office at 504 Fisher Building. This new branch is under the supervision of W. C. Burdick, sales manager.

**Inquiry No. 29434.**—A man in Portugal requires machinery, rails and electrical materials for railways. He also desires an agency. Terms, letter of credit in New York. Correspondence may be in English.

**Inquiry No. 29,436.**—A merchant in Italy desires to secure an agency from manufacturers for the sale of materials and supplies for electric railways. Terms, cash. Apply, using number, to Bureau of Foreign and Domestic Commerce, Washington, D. C.

**Poole Engineering & Machine Company**, Baltimore, has moved its general sales office from that city to 50 Church Street, New York. W. C. Tyler, formerly district manager at New York, has been appointed general sales manager in charge of all the selling activities of the company.

**George Shields**, for ten years purchasing agent of the American Car Company, of St. Louis, and later with the National Safety Car & Equipment Company since its organization, has become associated with the Dayton Manufacturing Company as sales representative, with headquarters at Dayton, Ohio.

**Roller-Smith Company, New York**, has appointed A. H. Savage its representative at St. Paul, Minn. Prior to 1914 Mr. Savage represented the Fort Wayne Electric Works in St. Paul and in 1914 he became a representative of the Wagner Electric Manufacturing Company of St. Louis, he now being in charge of the St. Paul office of that concern. He is also treasurer of the Dakota Light & Power Company of Flandreau, S. D., and president of the South Dakota Power Association.

**Cafeteria for Kuhlman Employees.**—The G. C. Kuhlman Company has opened at its Cleveland works an extensive cafeteria for its employees. The excellence of the appointments of this cafeteria in every particular were appreciated by a party of about 140, made up of electric railway and supply men, who visited the shops on March 23 as guests of D. B. Dean of the Kuhlman Company. A short account of the dinner was published in the issue of May 31, but the place of the dinner was incorrectly given in that issue as the Hollenden Hotel.

**American Steam Conveyor Corporation, Chicago**, announces the appointment of Charles H. Florandin, formerly of the National Electric & Welding Company, New York, as general manager of its Eastern territory with headquarters at 110 West Fortieth street, New York City. Mr. Florandin, who assumes charge of his new duties May 1, was born in France and received his technical education at the Lycée de Marseilles. He is an engineer by profession and upon coming to the United States did important work with the Brooklyn City Railway Company in the early days when the road was being electrified. After five years' service with this company he joined the C & C Electric Company, New York, where he held a responsible position with them for many years. After a brief connection with the Western Electric Company, he returned to the C & C Electric Company and later organized the National Electric & Welding Company. During the war Mr. Florandin was a member of the welding committee of the Emergency Fleet Corporation.

## New Advertising Literature

**Chicago Mica Company, Valparaiso, Ind.**: Catalog No. 26 deals with "Micabond," electrical insulating material.

**Unit Railway Car Company, Boston, Mass.**: Bulletin describing new "unit" passenger and baggage car driven by steam engine mounted on the truck. The boiler is oil-fired and mounted in the front part of the car.

**Curtain Supply Company, Chicago, Ill.**: Revising its catalog and printed matter for reissuing in the form of bulletins illustrating and describing its various devices. The first of these is bulletin R-2 on the "Rex All-Metal Roller."

# Pittsburgh's Peacock Purchases from 2 to 1660

The last stop on our coast-to-coast-and-back-again schedule—and a record breaker! If you've ever been in the "Smoky City" you know about the *grades* and the severe traffic conditions. In 1904 Pittsburgh purchased two Peacock Brakes—a *trial* order. Now there are well over sixteen hundred Peacocks in service, the most recent installations being those on the last cars they built during 1916 and 1917.

Results speak for themselves, gentlemen!

## NOTE:

The cities shown in the series of advertisements just completed are only a fraction of the great number in which Peacock Brakes are simplifying and safeguarding electric railway operation and reducing brake maintenance costs, under every condition, from the lightest One-Man Safety Car to the heaviest, speediest interurbans. A series of advertisements to follow will deal with particular examples of Peacock efficiency.

## NATIONAL BRAKE CO.

Buffalo, N. Y.

# Bankers and Engineers

**Ford, Bacon & Davis,**
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

**STONE & WEBSTER**
Industrial Plants and Buildings. Steam Power Stations. Water Power Developments. Substations. Gas Plants. Transmission Lines. Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

**SANDERSON & PORTER**
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

**REPUBLIC ENGINEERS, INC.**
CONSULTING AND CONSTRUCTING ENGINEERS
*Valuations Reports Investigations*
*Designs Construction Management*
60 BROADWAY, NEW YORK
CLEVELAND, OHIO Illuminating Bldg. YOUNGSTOWN, OHIO Mahoning Bank Bldg.

**DWIGHT P. ROBINSON and COMPANY**
Incorporated
*Design — Construct — Finance — Manage*
UTILITIES — INDUSTRIALS
1 Broadway, New York

**Scofield Engineering Co.** Consulting Engineers PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

**ELECTRICAL TESTING LABORATORIES**
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

**THE J. G. WHITE COMPANIES**
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK
LONDON CHICAGO

**JOHN A. BEELER**
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

**WOODMANSEE & DAVIDSON ENGINEERING CO.**
ENGINEERS
CHICAGO
784 Continental & Commercial National Bank Bldg.

**A. L. DRUM & COMPANY**
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

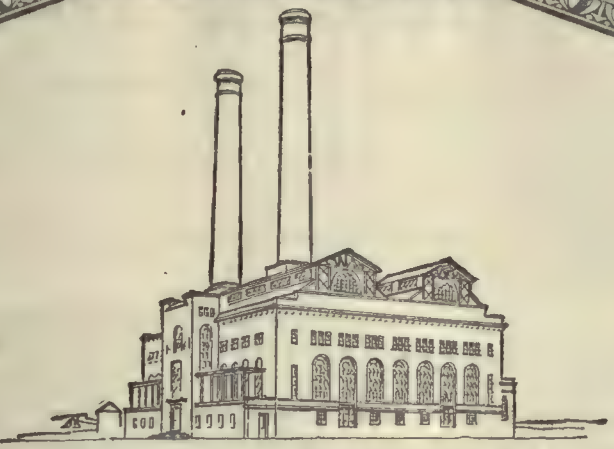
**ENGELHARDT W. HOLST**
*Engineer*
*Reports, Appraisals, Reorganizations*
683 Atlantic Ave., Boston, Mass.

**E. W. Clark & Co. Management Corporaton**
*Engineers*
Power Plants, Electric Power Transmission and Industrial Application
Huntington Bank Buiilding, Columbus, Ohio

**H. M. Byllesby & Company, Inc.**
NEW YORK Trinity Bldg. CHICAGO No. 208 So. La Salle St., TACOMA Washington
Purchase, Finance, Construct and Operate Electric Light Gas, Street Railway and Water Power Properties
Examinations and reports Utility Securities Bought and Sold

**THE P. EDW. WISH SERVICE**
*Suite* 1710 DETECTIVES *Suite* 1102
Park Row Bldg., New York Board of Trade Bldg., Boston

Frederick Sargent A. D. Lundy
Wm. S. Monroe James Lyman
**SARGENT & LUNDY, *Engineers***
1412 Edison Bldg., 72 W. Adams St., Chicago, Ill.



POWER HOUSE, NEW YORK CENTRAL AND HUDSON RIVER RAILROAD CO., NEW YORK

# WHAT WE MAN WE MANAGE

The Thompson-Starrett Organization is not a brokerage proposition, borrowing its service from sub-contractors like an automobile of assembled parts, but a complete organization within itself, performing by far the greater part of all its work direct, hiring outside talent only where it makes for greater economy, and maintaining at all times absolute control of the operation in all its ramifications.

We not only take contracts, we take charge.

We not only conduct the work, we control it.

We not only man the job, we manage it.

*Our Advice is as Good as Our Service*

**THOMPSON-STARRETT COMPANY**
INDUSTRIAL CONSTRUCTION
CHICAGO NEW YORK PITTSBURGH

# Handicapping Salesmen

From the *"Improvement Bulletin,"* of Minneapolis.

"Fire me," said a progressive salesman to the manager, "I'm costing the house too much."

"What do you mean?" asked the boss, a puzzled expression on his face.

"I mean just this," replied the salesman, "I'm spending so much of my time explaining to prospective customers who I am, who my house is, what our goods are, and why they are worth buying, that I don't have much time left for selling. You know that a salesman rarely closes with a new prospect on his first call—the standing of the house must be established and the worth of his goods must be proved before he can do business. I find a lot of people who never heard of our products.

"I am introducing our firm to buyers when I should be selling those buyers our goods. I am giving an explanatory talk where I ought to be giving a sales talk. I am developing acquaintance instead of consummating sales; I am merely educating prospects, not selling them.

"I am drawing a salesman's pay, but am not doing a salesman's work nor getting a salesman's results. My salary is not too large for a salesman but it is too large for an 'introducer,' therefore, I am a money-loser for the house. Introductory work is a very necessary part of selling, but it cannot and should not be done in person—it is too slow and expensive."

"Well, what is the answer?" asked the manager.

"Do all this preliminary work for me by means of effective advertising before I reach the prospect," the salesman suggested.

"It can be done a hundred times better and cheaper in this way than I can ever hope to do it. It will increase my efficiency because I can then dispense with generalities and get right down to the business of selling."

Electric Railway Journal
Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.
Tenth Ave. at 36th St., New York

# Lincoln Dynamotor

## Portable Bonder and Welder

Bonding Track with Lincoln Bonds welded to the Track by the Lincoln Dynamotor

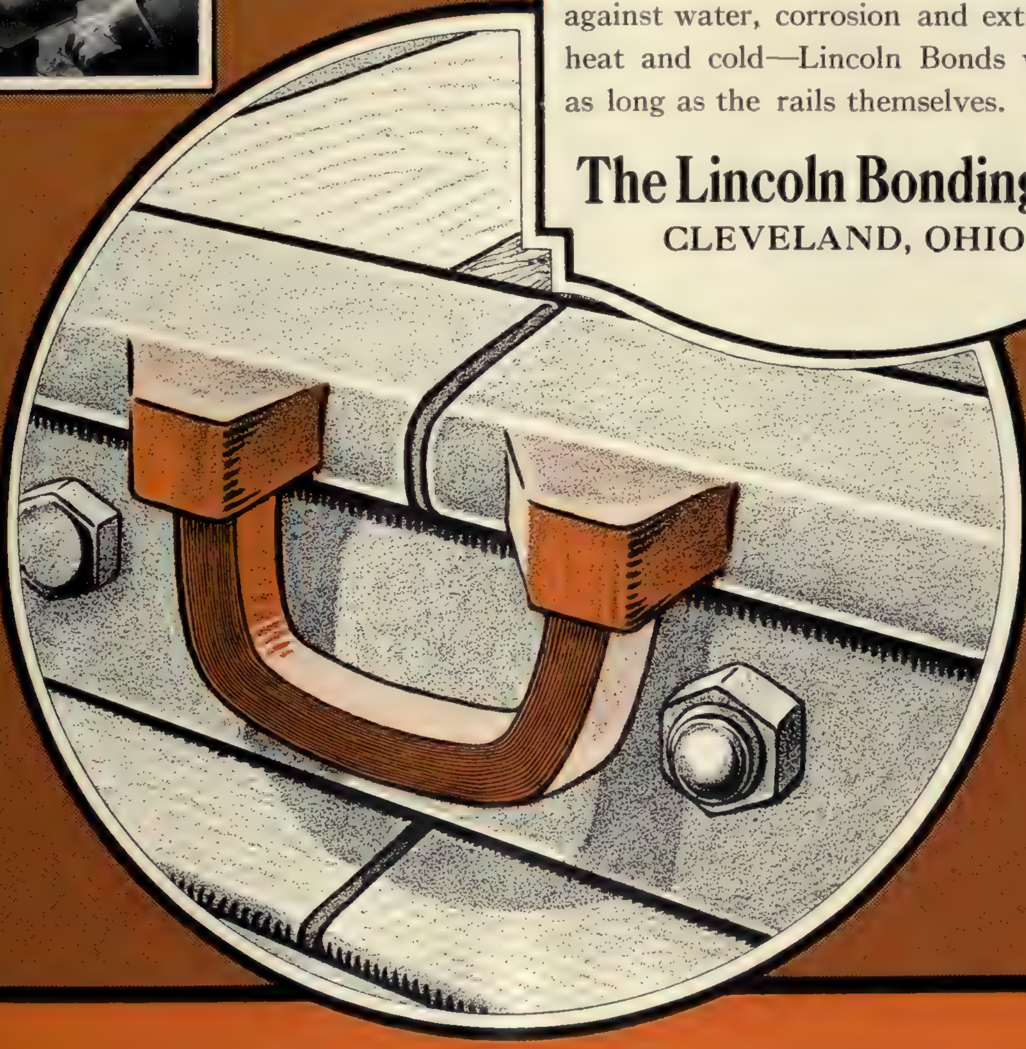
Repairing worn Car Equipment with the Lincoln Dynamotor

### Bonds That Last as Long as the Rails

The Lincoln Dynamotor (Portable Rail Bonder and Welder) makes every rail bond **permanent** with Lincoln Bonds.

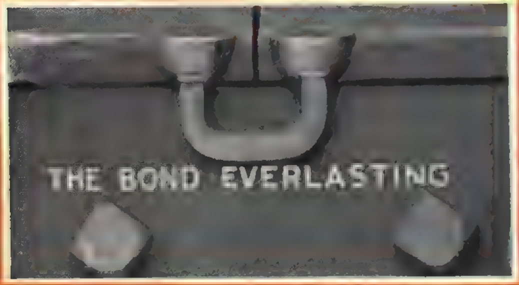
Solidly welded into one piece with the rail itself, yet flexible enough to give to the play of the track without breaking—proof against water, corrosion and extremes of heat and cold—Lincoln Bonds will last as long as the rails themselves.

**The Lincoln Bonding Co.**
CLEVELAND, OHIO



OVER

# Why Lincoln Bonds Last

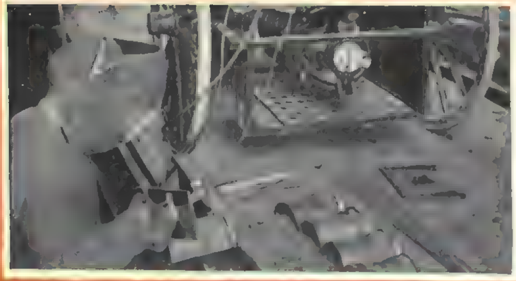


**BONDING**—The Lincoln Bond is made from laminated copper specially drawn and heat treated. It is flexible and non-corrodible even under the severest conditions.

A perfect weld is made by the Lincoln Dynamotor between bond and rail by means of a carbon arc. Owing to the special design of the Lincoln Bond and the method of welding, the head is melted into the laminations at the same time it is being fused into the rail. Thus every lamination is securely welded to head and rail.

The intimate fusion of bond and rail is shown in this photo of the finished Lincoln Bond. There is no reason for such a weld to fail—it is always there with perfect contact.

Write us to tell you more about the Lincoln Dynamotor and Lincoln Bonds.



**Shop Welding**—The Lincoln Dynamotor is a perfect motor-generator arc welding set in one, and will reduce your operating costs in other directions. You can weld your damaged or worn crossovers and turnouts, cupped rails and corrugations. It will enable you to reclaim for useful service 90% of the worn car equipment you are now scrapping.

## The Lincoln Bonding Co., :: 636 Huron Road Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City.
LINCOLN BONDING CO., - - - , Fisher Building, Chicago, Ill.
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia, Pa.
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building, Pittsburgh, Penn.

CHATTANOOGA ARMATURE WORKS, - - Chattanooga, Tenn.
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.
BURTON R. STARE COMPANY, - - Yesler Way Seattle, Wash.
A. A. WIGMORE, 441 Pacific Elec. Bldg., - - Los Angeles, Calif.
CHARLES N. WOOD COMPANY, 14 Federal Street, Boston, Mass.

# How Thermit Insert Welds make rails jointless

## 4. "Before we pour the Thermit Steel we heat the rails and bake the molds."

"This is the 'preheating process.'

"Preheating is one of the most important steps in the Thermit Process. The rail ends are brought to a bright red heat before the Thermit steel is poured. Our portable electrically-driven blower operates four gasolene burners and therefore heats four joints at once.

"Preheating also bakes the mold and heats a can of additions which is later added to the Thermit in the crucible to improve the quality of the steel.

"Understand, gentlemen? Very well, let's go to our next picture—filling the crucible."

**See these movies on your office wall!**

*We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.*

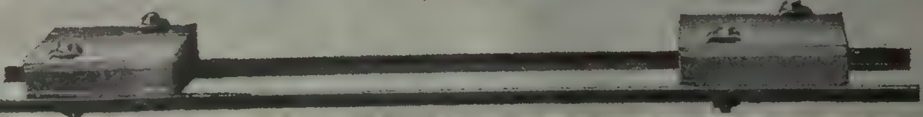
**Metal & Thermit Corp.**
**120 Broadway, New York**

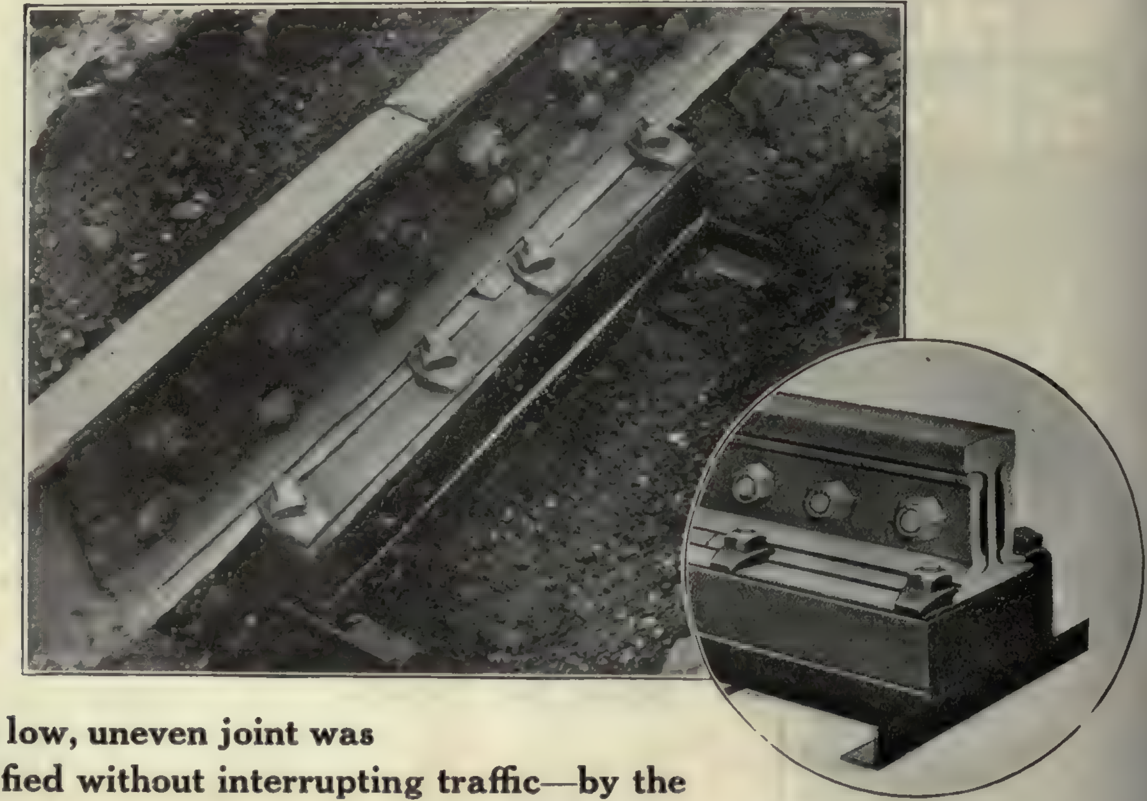
BRANCHES
329-333 Folsom St., San Francisco.
15 Emily St., Toronto, Ont.
7300 So. Chicago Ave., Chicago.
1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

The Ten Steps
1—Placing the Insert
2—The Sand Molds
3—Clamping the Molds
4—Preheating
5—Filling the Crucible
6—Pouring the Steel
7—Removing the Molds
8—Grinding the Weld
9—Maintaining Traffic
10—Inspection trip

# The MECHANICAL RAILWAY TIE





**This low, uneven joint was rectified without interrupting traffic—by the**

# DAYTON RAIL JOINT BOOSTER

All they did was to cut out the old failure of a supporting structure, clamp and weld the Dayton Booster into place, jack up the rails and fill the hole with concrete! Simple, isn't it? Yet a "Sure Cure" (in the truest sense of that old fashioned expression) for all low joint troubles. The upper illustration gives you a good idea of the small amount of excavation that is necessary. The lower cut shows a cross-section of this Booster. TRY some on the worst joints in your line and convince yourself that here is a vitally important source of economy that will be mighty welcome in these days of uncertainty.

***Order One for Trial and Be Convinced***

THE DAYTON MECHANICAL TIE CO.
**704 Commercial Bldg.**
**DAYTON, OHIO**

## Economy *Versus* Waste

These two factions are fighting for control of your car house today. The antiquated oil barrel typifies waste in its most expensive form. Economy is represented by

### GILBERT & BARKER OIL HANDLING OUTFITS

They insure a constant saving of oil because they are leak-proof and dirt-proof and there is no evaporation. The pumps in the square insert were installed in the Main Oil Room of a large Street Railway Co. This system quickly saved the installation cost.

You will do well to investigate these modern G & B Oil Handling Outfits today. Send for Bulletin 60.

**Gilbert & Barker Manufacturing Co.**
**Established 1865**
**Springfield, Mass.**

Sustaining Prolonged Overloads in the Home of WRIGLEYS SPEARMINT

A Ten Per-Cent Coal Saving

Efficiency and Economy of Fuel and Labor —in the Power Plant of The Chicago, Lake Shore and South Bend Railway Company

275% of Rating Burning Lignite

Maintaining Overloads Twenty-four Hours a day In The Home of →

Burning High-ash Illinois Screenin without clinker t

The Investment That "Modernized" This Plant Yields a 33.5% Return.

Behind a Million and a Half Boiler Horse —Green Chain G

Behind Green Chain G 21 Years of Experience Specialized Field of Comb

A Great Record —but Typical

A Big Plant With a Big Story —Green Equipped

Stoker Must Work Right In the Mine Plant

You Can't Adapt the Fuel to the Mine Stoker

In One of Chicago's Most Efficient Power Plants

In the Plant of the High Speed Third Rail System

Linked With the Names of Foremost Consulting Engine

Maintaining Doubled Capacity for Long Periods —in a Big Chicago Office Building

Some Big Jobs of Stone & Webster —Green Equipped

**Backed by 21 Years of Specialized Experience**

Green Seaflex Arch
Green Pressure Waterbacks
Green Steam Jet Ash Conveyors
Green Materials Transfer and Storage Hopper

GREEN

An 8 Year Old Green Installation With a Labor Saving Record

Efficiency High Upkeep Low!

200% of Rating Continously With High Ash Iowa Coal

Combustion Engineering Big Problem

Putting a Superior Principle Into Better Practice

75% Efficiency After 14 Years of Uninterrupted Service

In the Burlington Route's Big Office Building

Mine Plant Calls for Highly Developed Stoker

GREEN CHAIN GRATES

# The Ads That Users Wrote

How do you judge the Green Stoker — gauge the ability Green Engineers?

We believe you are more interested in what users say than hat we say!

We believe you are more interested in results than causes day in and day out results, rather than test results.

You have a right to demand the story of what Green Chain ates are accomplishing, from men who are familiar with eir every-day performance.

That is why we have given you the story, first hand, of een Stokers that operate under every condition in every vice — everywhere.

And we believe that the plain story of high efficiency told by users through these, and many more similar ads, is more convincing than any statement our own salesmen can make.

* * *

The new Green Book, "PROGRESSIVE COMBUSTION", a 92-page digest of 21 years of accumulated engineering data will be sent you upon receipt of request on your Company letter-head, giving your position. Write Dept. C.

Driving engine requires 30 lb. steam per hour for largest stoker — no other steam consuming auxiliaries — all efficiency figures are quoted net.

No clinkers — least attendant labor.

**GREEN ENGINEERING CO.**
*Main Offices and Shops:*
**East Chicago, Indiana**

**CHAIN GRATES**

"K" Type for Clinkering Coals "L" Type for Coking Coals

# Hale & Kilburn League of Nations

## For Comfort and Durability In Car Seating America, Belgium, England, France, Greece, Italy, Russia, Turkey

Allied, neutral and enemy nations may disagree in economics and politics, but when it comes to COMFORT IN CAR SEATING they are all of one mind.

With international trade competition so keen, what finer tribute to Hale & Kilburn seating could be found than its use among such a diversity of nations?

We secured orders from and gave satisfaction to these countries because we had the experience that enabled us to guarantee a durable and comfortable seat despite wide variations in both car operating conditions and human garb.

Adaptability to special conditions is just as marked in the case of

## Hale & Kilburn Seating for Safety Cars

Whether you want a seat of the standard car type or something more along the lines of automobile practice, we are prepared to make it.

This unmatchable H & K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

HALE & KILBURN
*No. 108-AV Stationary Seat*
*for One-Man Safety Cars.*

## Hale & Kilburn Corp.

Philadelphia
New York
Chicago

Washington
Atlanta
Louisville

St. Louis
Detroit
San Francisco

# The International Register Company

announces the sale of its patents and patent applications relating to

## Money-Counting Fare Boxes and Coin Registers

to the

## Johnson Fare Box Company, of Chicago

Type R-5—Double Register

Type R-10—Single Register

and also the good-will of that part of its business, the sale to take effect July 1st, 1919.

After that date we will continue to manufacture and sell all types of our standard fare registers as before, as well as our line of car fittings, but we will not manufacture or sell money-counting Fare Boxes or Coin Registers.

All of our guarantees now in force will be carried out the same as if the sale had not taken place, and repair parts for machines on which guarantees have expired will be furnished by us at regular prices up to July 1st, 1920, on which date the special tools and dies will be turned over to the Johnson Fare Box Company, who will supply repair parts thereafter.

**It is a part of the consideration of this sale that all purchasers of International Fare Boxes and Coin Registers up to July 1st, 1919, are licensed under the patents owned by the Johnson Fare Box Company.**

# The International Register Company

**Manufacturers of Fare Registers and Railway Supplies, and General Selling Agents for HEEREN ENAMEL BADGES**

**Office and Factory: 15 So. Throop St., Chicago, Illinois**

# Announcing

*The Purchase of the Registering Fare-Box Business and Good Will of the International Register Co. by the*

## Johnson Fare Box Co.

Effective July 1, 1919, the Johnson Fare Box Co. will take over the REGISTERING FARE-BOX BUSINESS of the International Register Co.

THE INTERNATIONAL REGISTER CO. will continue to furnish such repair parts as may be required by those properties now using their boxes, until July 1, 1920. After that date, such parts as may be required will be furnished by the JOHNSON FARE BOX CO.

We want to assure all former customers of THE INTERNATIONAL REGISTER CO. that it is our intention to render them the same service as we render our own customers in their efforts to maintain their Fare Boxes in the highest state of efficiency and to aid in the solution of all their problems in fare collection, which may come up in future.

# Johnson Far

**Jackson Boulevard**

**50 East**

*Johnson Metal Tickets Used with Johnson Fare Bo*

Johnson Station Platform Registering Fare Box Motor Driven.

# The Johnson System of Fare Collection

can be modified to meet any fare collection requirement whether it be for the one man safety car, the ordinary prepayment car, prepayment station or "what not." There is a Johnson combination device that will serve the purpose and do it in the most satisfactory way, either by hand operation or electric motor drive.

And the rate of fare makes no difference in the satisfactory application of the Johnson system, for there is a combination device that will take care of any flat fare rate—single coin, odd cents or metal tickets.

**The Johnson Type D Registering Fare Box** is designed to take care of coins only, or where a metal ticket, selling for an even number of cents is used to register as cash.

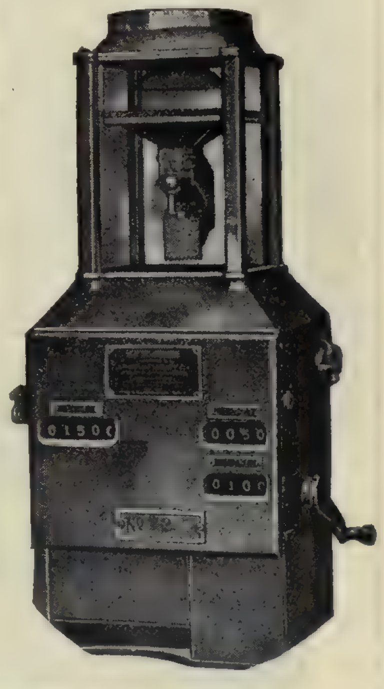
**The Johnson Type D M-2 Registering Fare Box** is designed for use with coins and one size of metal ticket, providing registration of metal tickets on a separate dial.

**The Johnson Type D M-3 Fare Box** is designed for use with coins and two sizes of metal tickets, providing registration of each class of ticket on separate dials.

**The Johnson Motor Driven Fare Box** is especially adapted to prepayment stations. Its use enables hundreds of passengers to pass each minute, allowing the cars to be loaded while conductors attend to the safety and comfort of passengers.

**For subway and elevated stations** its use enables the handling of maximum crowds with a minimum amount of confusion and in the shortest possible time.

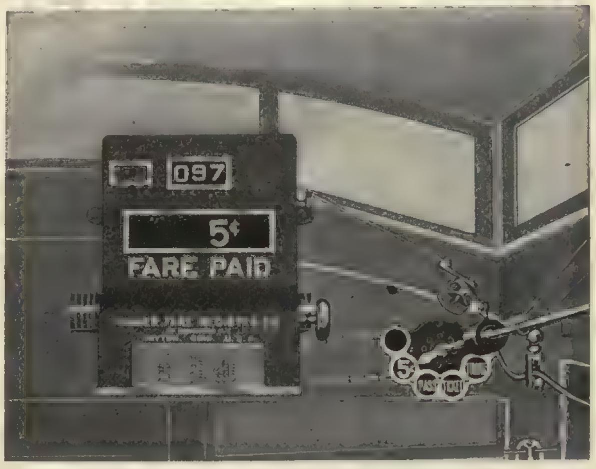
**Let us give you details and the proper solution of your problems in fare collection.**



# Box Company

**bbey Street, Chicago**
**eet, New York**

onstitute the Ideal System of Fare Collection



A No. 39 Type Ohmer Fare Register

# Ohmer Fare REGISTERS

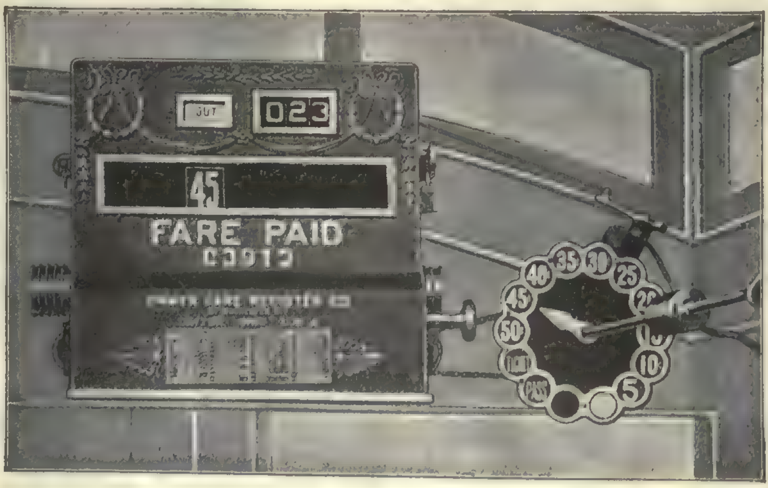
OHMER Fare Registers are made in many different types to meet the many different requirements of the electric railways. Every Ohmer Fare Register, however, whether it is one of the small city type machines with a capacity of but three or four fares, or one of the large interurban types registering over a hundred fare denominations, *is built on the same principle. Each fare is clearly indicated as it is registered. A permanent untamperable record of each fare is printed, together with all other necessary data.*

We illustrate a No. 39 City Type Ohmer Fare Register together with its printed record. We also show a No. 52 Interurban Type, adapted to ordinary interurban service.

| Time | Direction | Line No. | Transfers | Tickets | Passes | 5¢ Fares | Total Cash | Register Number | Total Passengers | Date | Identification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 23P | I. | 18 | 000 | 000 | 000 | 000 | $00.00 | 3 | 7470 | DEC 5 | INS8 |
| 4 23P | I. | 18 | 042 | 047 | 056 | 198 | $09.90 | 3 | 7470 | DEC 5 | 27 |
| 3 34P | 0. | 18 | 035 | 032 | 036 | 163 | $08.15 | 3 | 7393 | DEC 5 | 27 |
| 2 25P | I. | 18 | 024 | 017 | 021 | 106 | $0530 | 3 | 7295 | DEC 5 | 27 |
| 1 36P | 0. | 18 | 007 | 009 | 008 | 050 | $0250 | 3 | 7201 | DEC 5 | 27 |
| 12 27P | I. | 39 | 000 | 000 | 000 | 000 | $00.00 | 3 | 7127 | DEC 5 | 27 |
| 12 27P | I. | 39 | 072 | 074 | 068 | 247 | $1235 | 3 | 7127 | DEC 5 | 14 |
| 11 27A | 0. | 39 | 059 | 055 | 043 | 189 | $0945 | 3 | 7012 | DEC 5 | 14 |
| 10 38A | I. | 39 | 034 | 034 | 016 | 138 | $0690 | 3 | 6888 | DEC 5 | 14 |
| 9 29A | 0. | 39 | 016 | 015 | 003 | 063 | $03.15 | 3 | 6763 | DEC 5 | 14 |
| 8 30A | I. | 39 | 000 | 000 | 000 | 000 | $00.00 | 3 | 6666 | DEC 5 | 14 |

Report from a No. 39 Type Ohmer Fare Register

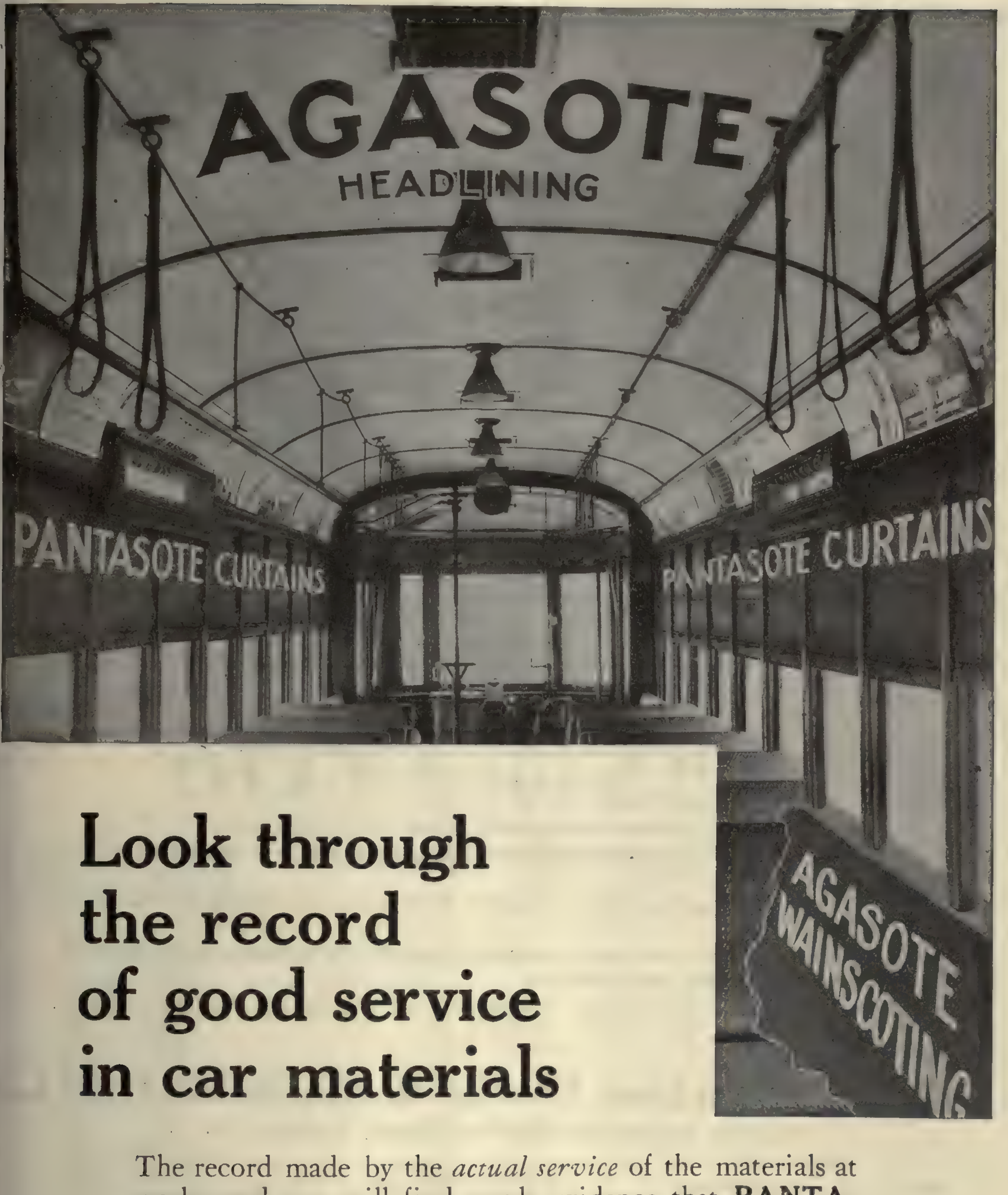
Let us explain some of our other types to you. Our experience has shown that we can meet every requirement with some one of the many types of Ohmer Fare Registers. We will be glad to advise with you about your fare collecting problems. The services of our experts are at your command without obligation to you.



A No. 52 Type Ohmer Interurban Type Register

**Ohmer Fare Register Company**

**Dayton, Ohio, U. S. A.**



# Look through the record of good service in car materials

The record made by the *actual service* of the materials at work—and you will find ample evidence that **PANTASOTE** Curtains and **AGASOTE** Roofing—Headlining—Wainscoting have proven to be big factors in developing "better service at lower cost."

## THE PANTASOTE COMPANY

11 Broadway, New York People's Gas Bldg., Chicago, Ill. 751 Monadnock Bldg., San Francisco, Calif.

# Columbia-Made Forgings

**are**

**Safest**

Columbia-made Drawbar Links

If you could compare your metal-working facilities with ours, you would see one reason why so many railways—large and small—are our permanent customers.

Brake rigging forgings in particular must, above all, possess the quality of SAFETY.

That quality is assured by means of specialized Columbia Equipment operated by Columbia specialists.

We have the facilities not only to give you quality, but just prices and prompt delivery, too.

## Columbia Machine Works & Malleable Iron Co.

**Atlantic Avenue and Chestnut Street, Brooklyn, N. Y.**

TOOLS

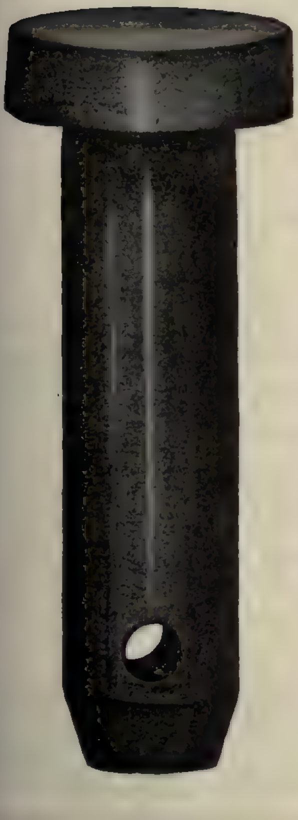
- Armature and axle straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd., Toronto, Ont.

CAR EQUIPMENT

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

# You might know that they're BOYERIZED down in Tampa



This table shows the result of making car-riding pleasanter and SAFER.

At Tampa now the word "Safety" means SAFETY in every respect. Which accounts for their use of CASE-HARDENED Boyerized Brake Pins and Bushings for all brake rigging — particularly to overcome the grinding action of fine sand on ordinary materials.

The following table gives comparison of the car-miles and earnings of the safety versus the old open-type of equipment:

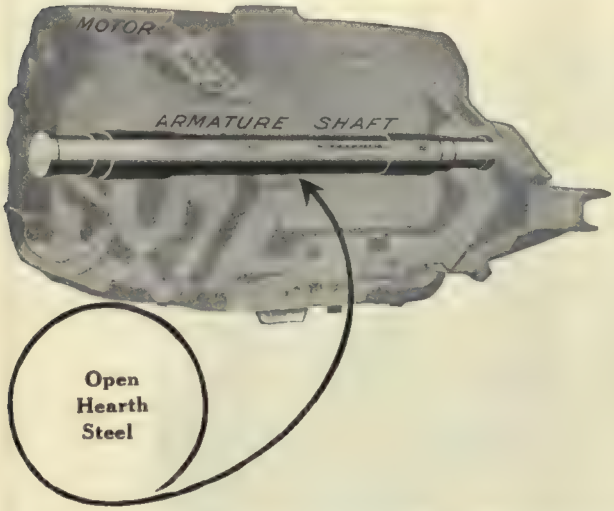
| | 1918 | | 1917 | |
|---|---|---|---|---|
| | Car-Miles | Cents Per Car-Mile | Car-Miles | Cents Per Car-Mile |
| MICHIGAN-HYDE PARK | | | | |
| January (27 days) | 34,800 | 20.5 | 26,650 | 21.9 |
| February | 44,331 | 22.0 | 37,309 | 22.5 |
| March | 48,866 | 22.0 | 37,437 | 23.8 |
| April | 48,528 | 20.4 | 36,848 | 22.2 |
| May | 50,222 | 18.5 | 38,004 | 21.6 |
| June | 48,203 | 19.4 | 36,778 | 20.2 |
| July | 49,220 | 18.8 | 37,987 | 20.1 |
| August | 49,041 | 19.2 | 37,852 | 19.9 |
| WEST TAMPA | | | | |
| July (26 days) | 31,670 | 20.5 | 21,740 | 18.8 |
| August | 39,335 | 20.9 | 25,822 | 20.6 |

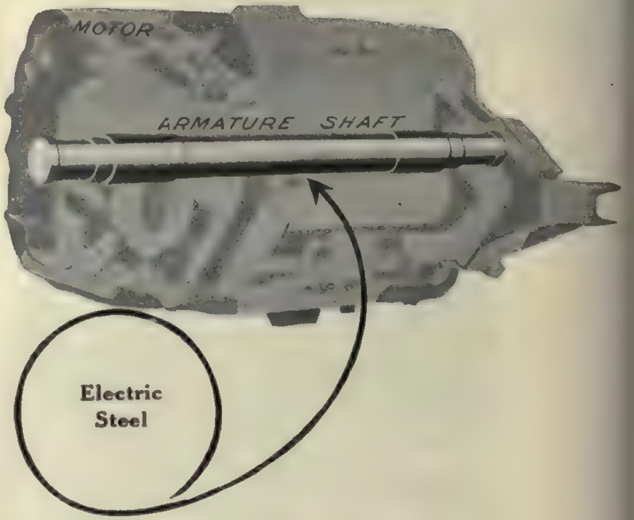
ELECTRIC RAILWAY SUPPLIES

**Bemis Car Truck Company**

SPRINGFIELD MASS

# Which Shaft Is Stronger?





To the uninitiated, two steel armature shafts may *look* exactly alike. But in reality they can differ greatly in ultimate and shearing strength, elastic limit, tension and other factors of vital importance to both the manufacturer and the users of electric railway motors.

## *Test results prove the Superiority of*

# Electric Steel Armature Shafts

| Properties | Open Hearth Steel | Electric Steel General Steel Co. |
|---|---|---|
| **Ult. Strength, lbs. per sq.in.** | **91,200** | **107,700** |
| **Elastic Limit, lbs. per sq.in** | **46,000** | **69,950** |
| **Elongation in 2 in.** | **22.2%** | **23.5%** |
| **Reduction of Area** | **44.8%** | **50.0%** |
| **Fracture** | **Silky, small cup.** | **Silky, full cup.** |
| **Elastic—Torsion, lbs. sq.in.** | **16,750** | **33,700** |
| **Shearing Strength, lbs. sq.in.** | **62,400** | **76,000** |

To users of Electric Railway motors: You will get the best service from your motors if you insist upon Electric Steel Armature Shafts.

We are equipped to handle the forging of armature shafts and axles from our own manufactured electric furnace steel, and do the heat treating.

## General Steel Company

**Public Service Building, Milwaukee, Wis.**

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

S BRAND *"The 'Standard' Brand on your material is an assurance of eventual economy."* S BRAND

# STANDARD STEEL WORKS CO.

GENERAL OFFICES:

MORRIS BUILDING, PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA

RICHMOND
SAN FRANCISCO
NEW YORK
MONTEREY, MEX.

MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

Takes years to build a good reputation—
Takes minutes to acquire a poor one.
Takes years to build a good Safety Car—
years of experience. Takes minutes
just to blueprint one—
St. Louis Cars have the reputation
for being built right—
Right design—right workmanship—right
materials—right light weight.
We put the car behind the blueprint—
in our "Quality Shops."
Took years to teach us how. Built
the first one man car---- been
a'learning ever since—

St. Louis Car Co.
St. Louis, Mo.

OKONITE
TRADE MARK
REG. U. S. PATENT OFFICE.

# The Standard for Rubber Insulation

## Power Cables—Signal Wires—Car Wires
## Motor Leads, etc., etc.

Steel Armored—Lead Covered—Braided

*We Manufacture*

| | |
|---|---|
| Okonite (Rubber) Insulated Wires and Cables | Okonite Tape—(Rubber Insulating) |
| Varnished Cambric Insulated Wires and Cables | Manson Tape—(Rubber Filled Cloth) |

*Samples and Estimates on Application*

**THE OKONITE COMPANY, Passaic, New Jersey**

CENTRAL ELECTRIC CO., Chicago, Ill., General Western Agents

F. D. Lawrence Electric Co., Cincinnati, O. Novelty Electric Co., Philadelphia, Pa. Pettingell-Andrews Co., Boston, Mass.

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# You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

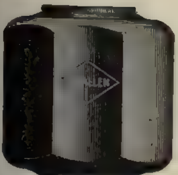
# The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

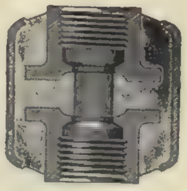
It will pay you to write for information and prices.

## The Macallen Insulating Joint



**Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.**

**May We Send Our Catalog?**



TRADE MACALLEN MARK

## The Macallen Company
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK

**He *Can't* Miss It!**

# It's BIG —and *Reliable*

and can be *seen* so as to give your motormen plenty of time to bring the car to a stop—avoiding what might be a fatal accident at a sharp curve or switch.

## U. S. Electric Signals

will be so installed on your road that the first car to reach a cut-in contactor, will have the right of way against opposing cars—preventing side-swiping accidents and providing front and rear protection as well.

**"Prevent" instead of "cure." Start now.**
**Write for particulars.**

**United States Electric Signal Company**
**West Newton, Massachusetts**

**Representatives:**
**Western: Frank F. Bodler, Monadnock Bldg., San Francisco**
**Foreign: Forest City Electric Service Supply Company, Salford, Eng.**

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# Electrical Wires and Cables

- Trolley Wire
- Telephone Wire
- Wire Strand
- Transmission Wire
- Steel Contact Wire
- Wire Rope Slings

WIRE ROPE

## JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY

**New York Boston Chicago Philadelphia Pittsburgh Cleveland**
**Atlanta San Francisco Los Angeles Seattle Portland, Ore.**

You Can Always "Bank"
On Your Line Equipment
If It Bears the
Well Known
Name —

ANDERSON

Aetna Insulation,
Trolley Bases, Harps
and Wheels
Section Switches,
Quick Break Switches,
Cross-Overs, etc.

*Write for our Catalog No. 8.*

**Albert & J. M. Anderson Mfg. Co.**
(Established 1877)
289-293 A Street, Boston, Mass., U. S. A.

BRANCHES:
New York 135 Broadway
Chicago, 105 So. Dearborn Street
Philadelphia, 429 Real Estate Trust Bldg.
London, E. C., 48 Milton Street

DU PONT AMERICAN INDUSTRIES

IN CASES OF NECESSITY

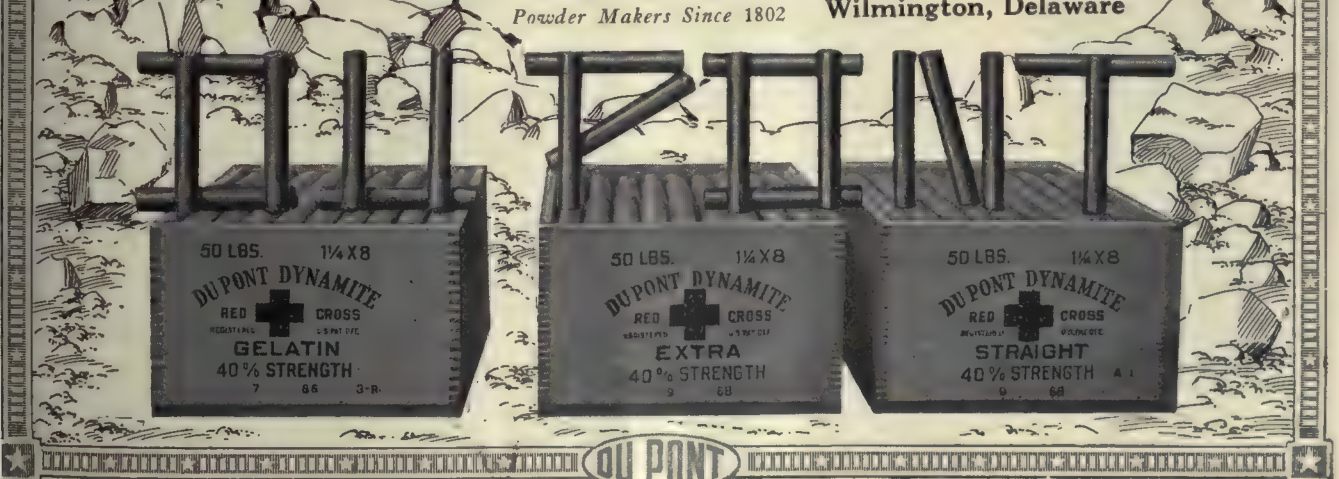
In the present construction era the demand for railway extension makes it imperative that more attention be given to the selection and use of explosives in grading, tunneling and other cases of necessity.

The introduction of RED CROSS Explosives and the use of correct detonation methods are steps that speed up road building by making possible greater daily progress.

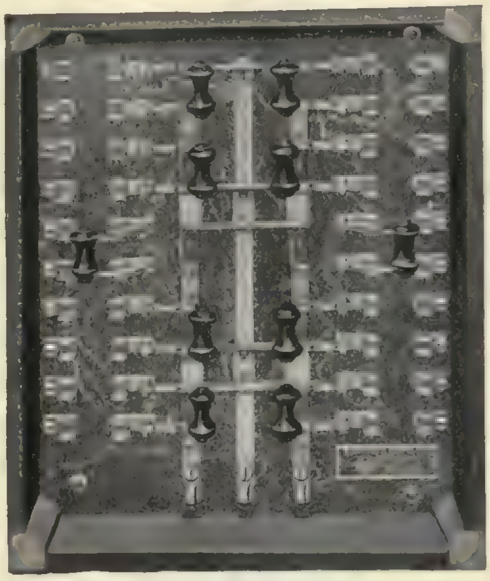
Red Cross Explosives are manufactured by the largest makers of explosives, whose century of experience enables them to produce explosives especially adapted to the requirements of railroad construction—in fact, to make explosives for every blasting condition.

For information about Red Cross Explosives, write for a free copy of our "High Explosives Catalog." Address Advertising Division,

**E. I. du Pont de Nemours & Co.**
*Powder Makers Since* 1802 Wilmington, Delaware



# Minimum Number of Contact Surfaces in a Krantz Straight-Line Panel Board



The narrowest live-faced panel board on the market. Principal parts interchangeable from front of board. Switches arranged so that Fuses are replaceable when dead.

Corner irons are adjustable.

WESTINGHOUSE ELECTRIC

Because of its patented method of construction, a 10-circuit Krantz Straight-Line Lighting Panel Board consists of but 29 contact making pieces having but 9 contact surfaces. Compare this simplicity with the ordinary panel board having a much larger number of contact surfaces.

**Contact surfaces are trouble makers:**

Hence Krantz Straight-Line Panel Boards are the most reliable in service. No soldered joints.

Quick delivery of panel boards of every size and type.

Send for catalogue of Krantz Straight-Line and Safety panel boards. Ask for Miniature Catalogue 1B-5.

**Westinghouse Elec. & Mfg. Co.**
**East Pittsburgh, Pa.**

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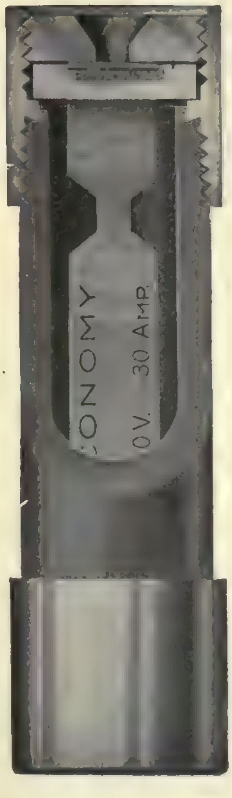


# ECONOMY
## renewable FUSES

stand between the user and unnecessary expense. An inexpensive "Drop Out" Renewal Link restores a blown Economy Fuse to its original efficiency. The resultant saving approximates 80% of annual fuse maintenance costs as compared with the use of one-time fuses.

This economy is effected with safety, as years of use have conclusively proved that Economy Fuses are all that could be desired as regards accuracy of rating and all-around efficiency.

They cost least and serve best.

If you are among the thousands of Economy users you already know this. If not, *try* them and you *will* know.

Sold by leading jobbers and dealers everywhere.

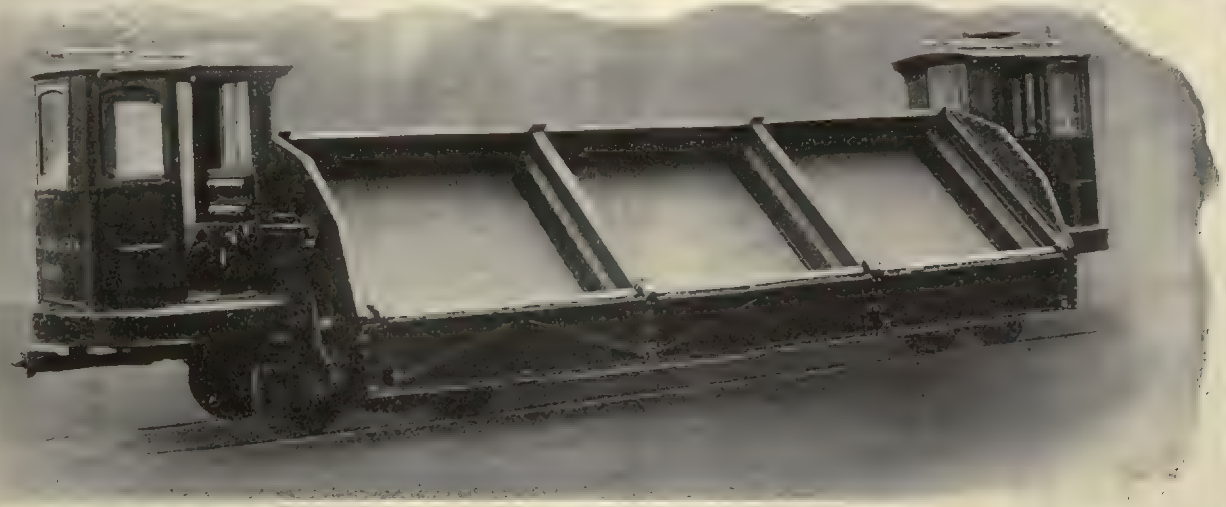
***Write for Catalog 17.***

## ECONOMY FUSE & MFG. CO.

**Kinzie and Orleans Sts.** **CHICAGO, U. S. A.**

*Sole manufacturers of "ARKLESS"—the Non-Renewable Fuse with the 100% Guaranteed Indicator*

*ECONOMY FUSES ARE ALSO MADE IN CANADA AT MONTREAL*



***Are you looking for equipment that will both SAVE and MAKE money for you?***

## Differential Electric Dumping Cars

will effect large savings by their use for maintenance of way, and in addition many Electric Railways have demonstrated their earning capacity when used to transport loose materials on a freight basis.

*Write for our Bulletin D3*

**DIFFERENTIAL CAR COMPANY, Inc., 141 Broadway, New York City**

### Central Electric Railway Association

# Mid-Summer Meeting and Cruise

### for Members, Friends and Guests, on the

### Steamer South American

Toledo, via Detroit, Georgian Bay, Mackinac, Harbor Springs and Benton Harbor to Chicago.

Four days of pleasure and profit. Monday, June 30, 1919, 9 a.m., from Toledo, to Thursday, July 3rd, 1919, 4 p.m., at Chicago.

Finest cruising steamer on the Great Lakes.

Has large dining room seating 280 at one time.

Large enclosed dancing room with fine floor.

Enclosed play-room on upper deck for children.

Splendid orchestra of six pieces.

**Cost of the trip, including berth and meals and War Tax, $26.50.**

**Children under twelve years of age, half fare.**

It is planned to limit the number to 350, which will give ample room without any crowding. It is necessary, therefore, that applications be sent in at once to secure accommodations.

Applications, with check, should be mailed to

**MR. JOHN BENHAM**
**Vice-President of The International Register Company**
**15 S. Throop St., Chicago, Ill.**

# The New MILBURN QUICK-WELD Torch

This newest development in welding apparatus makes it possible to use equal pressures of oxygen and acetylene on either light or heavy welding.

Over-supply of oxygen is eliminated, removing the danger of oxidizing the metal.

| Tip Number | Working Pressures |  | Metal Thickness |
|---|---|---|---|
|  | Oxygen | Acetylene |  |
| 6-J | 3 lbs. | 3 lbs. | ¼ inch |
| 7-J | 4 lbs. | 4 lbs. | ⅜ inch |
| 8-J | 6 lbs. | 6 lbs. | ½ inch |
| 9-J | 7 lbs. | 7 lbs. | ¾ inch |
| 10-J | 7 lbs. | 7 lbs. | 1 inch and up |

**Send for Folder No. 333 or let us send you a QUICK-WELD Torch on approval.**

*For night work use MILBURN acetylene lights for construction, railway, or shop*
*Ask for Booklet No. 233*

## THE ALEXANDER MILBURN COMPANY - BALTIMORE, U.S.A.

**BRANCH OFFICES:**

| NEW YORK | CHICAGO | PITTSBURGH | SAN FRANCISCO |
|---|---|---|---|
| 51 E. 42nd St. | 1012 Kimball Bldg. | 406 Bessmer Bldg. | 1037 Monadnock Bldg. |

**Canadian Representatives: Canadian Fairbanks-Morse Co.**

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*Hydraulic Bender Capacity 30 Tons*

# HYDRAULIC MACHINERY
## FOR THE ELECTRIC RAILWAY SHOP

We show here two hydraulic benders, one for bending and straightening trolley poles, conduit pipe, bars and other light bending; the other for bending I-beams, conductor rails and rails. They are built to withstand the rough handling of unskilled labor.

This pipe bender is built in standard sizes of thirty to forty tons' capacity, sufficient to bend one inch to six inch pipe.

This rail bender is an improvement over similar forms, being stronger and equipped with formed bending blocks. It will be seen that the yoke swings back for the rail to be inserted sideways.

**We build many other hydraulic tools for the car shop, such as shears, jacks, pit jacks, journal jacks, car jacks, presses, etc., all as carefully designed as the above to give the user the best service.**

*WRITE FOR CATALOGS*

*Portable Hydraulic Rail Bender*

## THE WATSON-STILLMAN COMPANY

W-S HYDRAULIC
46 CHURCH STREET, NEW YORK
CHICAGO: McCORMICK BLDG.
W-S HYDRAULIC

334

**TICKETS**

**You Can Get a Better Check on Fares**

with paper tickets than with the more expensive metal tickets. Besides, they are easier to handle.

Our tickets embody accuracy, quality and service and the price is reasonable.

We will furnish a ticket exactly like your sample.

If you are anticipating a fare change let us consult with you on your ticket problem.

Quotations? Send the sample.

***Weldon-Williams & Lick***

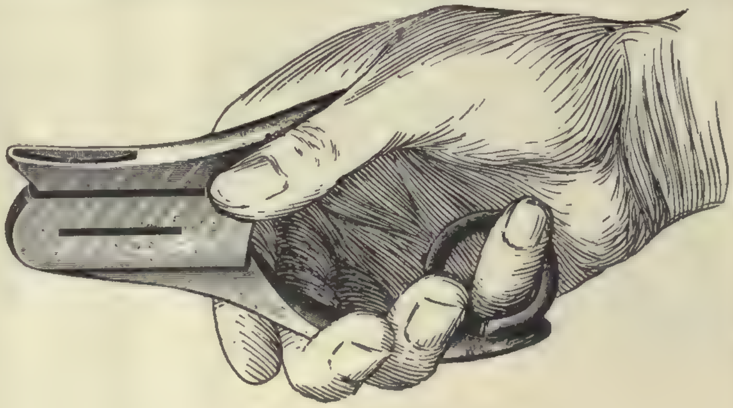
**FORT SMITH, ARK.**

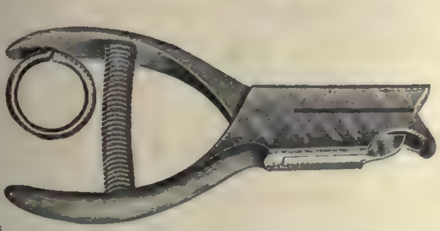
For Quality

**B-V Punches**

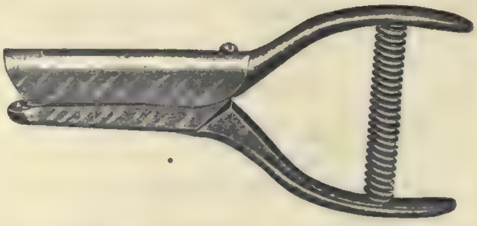
The Dies are Tool Steel

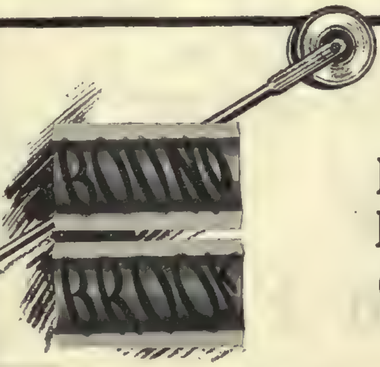
*100 Varieties*





Bonney
Vehslage
Tool Co.
Newark, N. J.





**Bound
Brook
*Oil-less***

**Trolley Wheel Bushings**

## Give Much Longer Service

THERE have been instances where a Bound Brook Oil-less Bushing has outlasted four or five trolley wheels—and was still sound and serviceable.

Oil-less Bushings have their own lubricant—*it never gives out.* They need less attention. They give far longer wear than any other type of bushings ever made. They are the only thoroughly efficient and economical bushings for trolley wheel service.

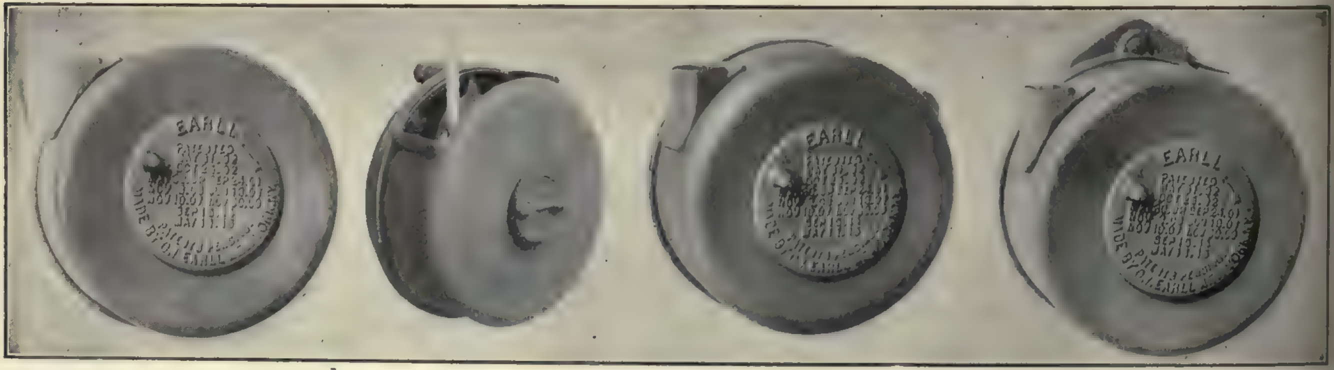
*All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.*

**BOUND BROOK OIL-LESS BEARING CO.**

Specialists in the manufacture of Oil-less Bushings for more than a third of a century

**BOUND BROOK, NEW JERSEY**

**Detroit Office, 1723 Ford Building**



The results of long study and successful manufacture of the Earll Catchers and Retrievers have taught us the varied requirements of users.

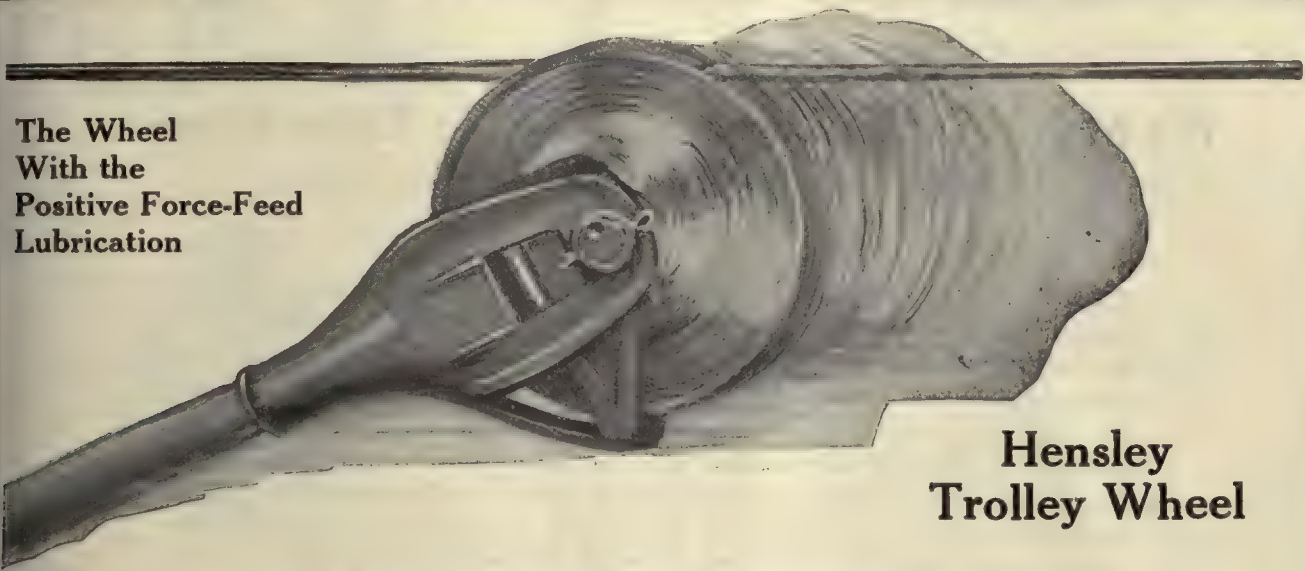
Every feature has been designed and adopted with knowledge of the conditions of operation.

The design, material and workmanship in all Earll Catchers and Retrievers give them a recognized position in the trade.

Earll Catchers and Retrievers assure users of the highest grade of service, convenience, efficiency and economy. They will bring these advantages to you.

**Holden & White, Inc.
Chicago, Ill.**
Newly appointed agents for the
Central and Middle Western States

**C. I. EARLL,**
YORK, PA.



**The Wheel
With the
Positive Force-Feed
Lubrication**

**Hensley
Trolley Wheel**

**"Jack of One Trade and MASTER of It"**

Our factory is devoted ENTIRELY to the manufacture of trolley wheels, harps and their necessary supplies. In other words, we are specialists in this line.

It is simply because we have equipped ourselves to manufacture trolley wheels better, faster and more accurately that we are now prepared to sell Hensley Wheels at such a low price.

***Let us tell you about the force-feed lubrication. Write***

**Hensley Trolley & Manufacturing Company**
**Detroit, Mich.**

***"You'll find them nice people to do business with"***

You are assured

Minimum
Cost

Maximum
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F. C. S. WHEELS

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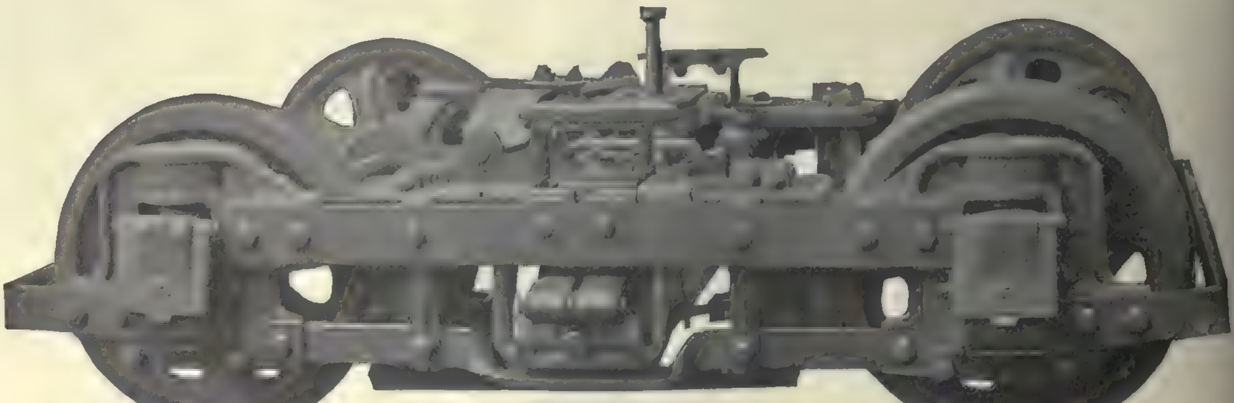

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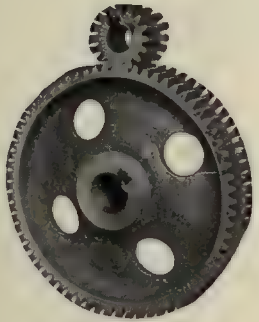

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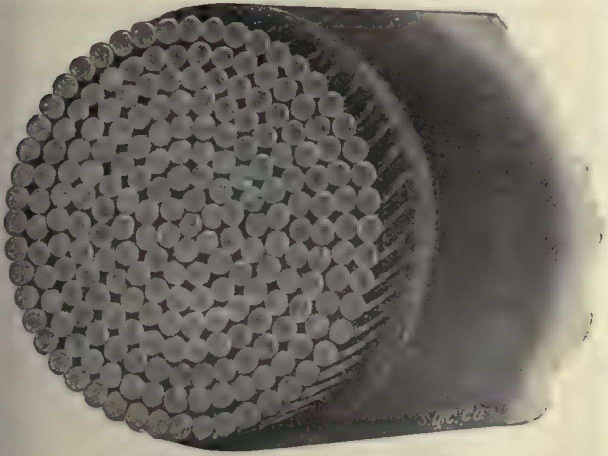

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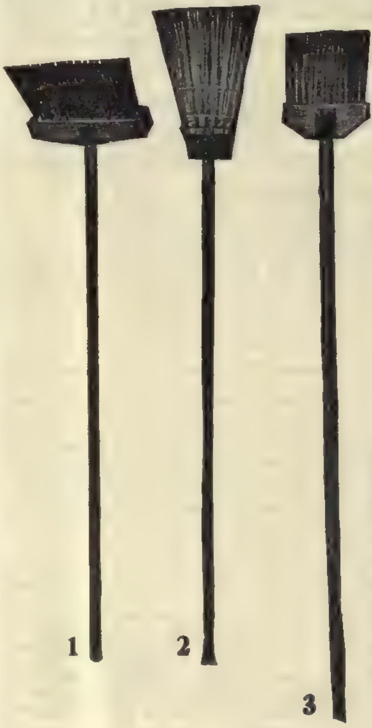

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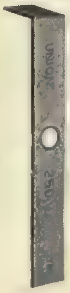

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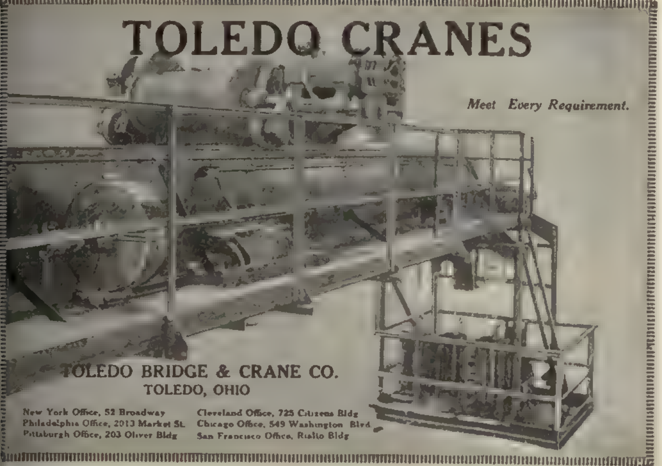
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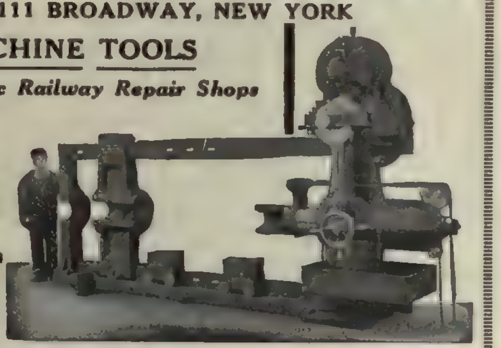
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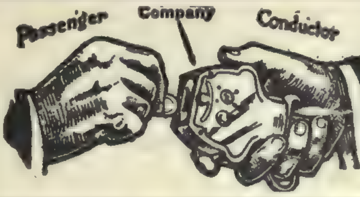

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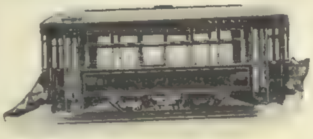

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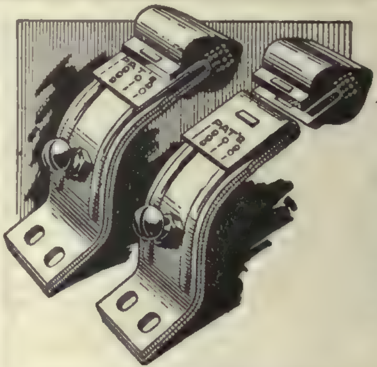

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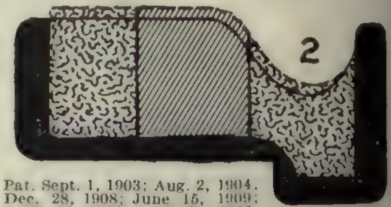


Wheel Condition No. 2

When the flange and outer portion of tread need truing use this style of

Pat. Sept. 1, 1903; Aug. 2, 1904. Dec. 28, 1908; June 15, 1909; April 15, 1914; April 20, 1915.

Wheel Truing Brake Shoe

You need not keep a crew of men for wheel removal and machines for wheel truing if you use our wheel Truing Shoes.

Wheeling Truing Brake Shoe Co.
Detroit, Michigan

See the Crank of the

CREAGHEAD DESTINATION SIGN

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

CREAGHEAD ENGINEERING CO., CINCINNATI, O.

VAN DORN COUPLERS

are made for every condition and requirement. M. C B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.
2325 So. Paulina St., Chicago, Ill.

Armature and Field Coils—Armatures Rewound

Commutators
Refilled
Prompt Service

THE KING-COIL MFG. CO., CLEVELAND, OHIO

"Trade Mark Reg. U. S. Pat. Off."

Samson Spot Waterproof Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 SAMSON CORDAGE WORKS, BOSTON, MASS.

# *Get Your Wants into the Searchlight*

## ADVERTISING RATES

### Ads Set in Uniform Style

(*Solid, in one paragraph, without display.*)

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

- Positions Wanted
- Evening Work Wanted
- Vacation Work Wanted
- Salesman Wants Connections

**FIVE CENTS A WORD**, minimum charge $1.50 an insertion, for advertisement under:

- Agencies Wanted
- Agents Wanted
- Business Opportunities
- Desk Room for Rent
- Educational
- Employment Agencies
- Desk Room Wanted
- Foreign Business
- Positions Vacant
- Partner Wanted
- Representations Wanted
- Salesmen Wanted
- Patents for Sale
- Plants for Sale
- Sub-Contracts Wanted
- Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

### Ads Set in Display Type

(*Individual space, within border rules.*)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $3.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

| | | | |
|---|---|---|---|
| 1 to 3 in., | $4.00 an in. | 15 to 26 in., | $3.70 an in. |
| 4 to 7 in., | 3.90 an in. | 27 to 49 in., | 3.60 an in. |
| 8 to 14 in., | 3.80 an in. | 50 to 99 in., | 3.50 an in. |

Rates for larger space furnished on request.

*For quick and satisfactory results tell the reader everything that he will want to know.*

## INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

| | |
|---|---|
| 36th St., at 10th Ave., | New York |
| 935 Real Estate Trust Bldg., | Philadelphia |
| 657 Leader-News Bldg., | Cleveland |
| 1570 Old Colony Bldg., | Chicago |
| 501 Rialto Bldg., | San Francisco |

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

POSITIONS VACANT

# EMPLOYMENT

POSITIONS WANTED

## POSITIONS WANTED

UDITOR solicits change; 13 years' experience in street railway accounting; age 35; married; references. PW-416, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

ASTER mechanic or general foreman. Age, 37; married; will be open for position after June 15; over 18 years with one company; the last three years as master mechanic. Willing to go anywhere. Best references. PW-422. Elec. Ry. Journal.

## ELECTRIC RAILWAY EXECUTIVE

There is an opportunity open in a large advertising service department for a man familiar with conditions existing in the electric railway industry, and the equipment bought and used, to capitalize upon his experience and become a trained advertising man with good chances for future development; his job will be planning and writing advertising copy for a leading technical publication covering the electric railway field; his work will be creative and interesting; he will enter upon a line of endeavor which offers a growing future; technical advertising writers in specialized fields are in demand; we can use the right man immediately; let your letter cover your experience fully.

P424 Elect. Railway Journal,
10th Ave. and 36th St., N. Y. City.

## EMPLOYERS

Send us your inquiries for men of technical training and experience. We are obtaining employment or soldiers, sailors and marines released from the ervice.

Re-Employment Bureau of New York City for Soldiers, Sailors and Marines, 505 Pearl Street, orth of Municipal Building, Professional Section, Worth 9250.

## POSITIONS WANTED

MASTER mechanic wants position; have had 15 years' experience in all lines of maintenance and construction; can handle men and get results; A-1 references furnished. PW-426, Elec. Ry. Journal, Philadelphia.

POSITION as traffic or schedule man or special investigations; 36 years old; married; technical graduate; 10 years' experience, including overhead, power and transportation departments. Best references past employers. PW-415, Elec. Ry. Journal.

SUPERINTENDENT of construction would like to take hold of transmission line or catenary construction; have had 12 years' experience as superintendent on this class of work; at present employed; minimum salary, $3000 and expenses, if a camp job. Address PW-427, Elec. Ry. Journal, Philadelphia.

SUPERINTENDENT wants position; 21 years' experience as dispatcher, chief dispatcher, trainmaster and superintendent of one of the largest interurban railroads in the country; 42 years old; can furnish A-1 references. PW-425, Elec. Ry. Journal, Chicago.

## AGENTS AND SALESMEN

**Do You Want Representation in Manchuria?**

Advertisers are invited to communicate with Messrs. Fukusho Company, Dairen, Manchuria, who are interested in all kinds of machine tools, engineering requirements and railway materials. If not already represented in Manchuria, Fukusho Company invite correspondence with this end in view. Advertisers are requested to forward catalogues, prices and terms offered.

**Sales Representatives Wanted**

Mechanical men wanted in all towns over 5,000 to sell in their spare time and on a commission basis, iron, steel and brass castings, forgings, structural and sheet work, machinery and tractor repairs for a group of engineering shops located in different parts of the country. This will not interfere with your present employment. AS-428, Elec. Ry. Journal, Chicago.

**Use Searchlight for Results**

WANTED

## OIL SALESMAN

A large corporation has need for an oil salesman to handle lubricating oils in the steam and electric railway trade.

He should be preferably a graduate engineer, who has had practical experience in locomotive and car shops, or at least has a good knowledge of shop conditions.

He must have had previous selling experience or be able to demonstrate sales ability. State qualifications in detail as to education and experience.

AS418-Electrical Railway Journal
935 Real Estate Trust Bldg., Phila., Pa.

# SALE OF GOVERNMENT-OWNED (NEW) BLACKSMITH TOOLS AND SHOP MACHINERY

**SEALED BIDS, will be opened 10 A. M. June 25, 1919**

at War Dept., Surplus Property Division, Munitions Building, Washington, D. C., for any or all of following, f.o.b. points of Storage, where they may be inspected.

1—**Steam Hammer,** Chambersburg, 6000 lb., double frame.

3—**Pattern Makers Lathes,** No. 25 Oliver, 16 in.

13—**Drill Grinders,** American style, for flat or twist drills from ⅛ to 3 in.

2—**Heavy Guide Bar Grinders,** 60 in.

2—No. 217 and 1—No. 218 **Newton Comb. Cold Cutting-Off Machines.**

2—**Single End Punch and Shears,** Ryerson, 1—18-in. throat, 1—60-in. throat.

1—**Double End Punch and Shear,** Ryerson, 42-in. throat.

1—**Belt Lacing Machine,** Jackson type, 18 in.

5—**Vertical Turret Lathes,** Bullard, New Era Type, 3—24-in., 2—42-in.

5—**Hack Saws,** Racine Type, 1—10B, 4—2B.

6—**Threading and Cutting-off Machines,** Oster Type, 304B.

1—**Pipe Threading Machine,** Oster Type, 306B.

Full particulars and special bid forms may be obtained at above Office and Zone Supply Offices: Boston, New York, Philadelphia, Baltimore, Newport News, Atlanta, Jeffersonville, Ind., Chicago, St. Louis, New Orleans, San Antonio, Omaha, El Paso, San Francisco. **Refer to S.P.D. No. 5200 ME.**

# RAILS

**15,000 TONS—NEW and RELAYERS**
**NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.**
**RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.**

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

**L. B. FOSTER COMPANY**
Park Building, Pittsburgh, Pa.

## Armature Coil Taping Machine

**Saves Time, Labor and Money**

A boy can tape 40 coils for Westinghouse 12A Armature in an hour. Further particulars gladly furnished.

**Geo. M. Griswold Machine Co.**
**New Haven, Conn.**

## Reconstruction! Re-equipping! Resuming!

Will *you* be one of those who were *not* ready?

**Business as usual—*NOW***

2000

FOR SALE

# SURPLUS MATERIAL AND EQUIPMENT

All classes of ship construction and Shipyard Plant Construction equipment and material including large quantities of

- Wood Working Machinery
- Machine Tools and Fixtures
- Electrical Machinery
- Boiler Shop Equipment
- Forge Shop Equipment
- Marine Equipment and Accessories
- Air Compressor Equipment
- Contractors Equipment and Supplies
- Bridge and Gantry Cranes
- Steel Plates, Shapes and Bars
- Pumping Machinery
- Scrap Metals
- Lumber
- Deck Equipment
- Galley Equipment

All parties interested in the purchase of any of the foregoing classes of material will receive formal invitations to bid periodically as the material is available if they will promptly request that their names be placed on mailing lists for the items in which they are interested.

**SALVAGE—UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION**
140 North Broad Street, Philadelphia, Penna.

# Let the "Searchlight" Carry Your Message to South America

and to Spanish-speaking Engineers and Industrial Executives everywhere. Through the Searchlight Section of the new McGraw-Hill paper

## INGENIERIA INTERNACIONAL

advertisers can now get in direct touch with Employment, Business and Professional Opportunities in

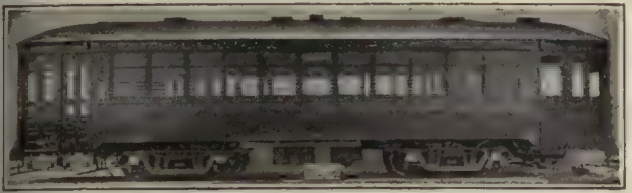
**South America Cuba Philippines and Central America Porto Rico Spain**

"Searchlight" advertisements will be printed in Spanish—same as the rest of the paper. No charge for translating copy. Get your copy in *now* for the next *issue*.

**ADVERTISING RATES:**

**Undisplayed Advertisements, 5 cents a word—minimum charge $1.50 an issue. Discounts for consecutive insertions.**

**Displayed Advertisements at $5.00 or less per inch per insertion, depending on the number of inches used. 30 inches to a page.**



## IMMEDIATE DELIVERY

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4 G. E. Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**
**111 West Monroe Street, Chicago, Ill.**
*Cars and Trucks, Snow Sweepers, Electric Locomotives*

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## ROTARY CONVERTERS

1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
*Telephone* 4337-4338 *Rector*

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SEARCHLIGHT
SERVICE
SECURES
SATISFACTORY
SITUATIONS
SALES

816

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## Turbo-Generator Units

### 60 CYCLE

10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

### 25 CYCLE

6500 Kw. Allis-Chalmers Horizontal Turbo Generator Unit, 3-phase, 25-cycle, 6600 volts, 4 pole, 750 RPM. Send for full details and specifications.

***We have these units in stock for immediate shipment. We own them and are not acting as brokers.***

**MACGOVERN & COMPANY, Inc.**
**114 Liberty Street, New York, N. Y.**
**Pittsburgh Office, 498 Union Arcade Building**

---

FOR SALE

## 80-LB. NEW SHANGHAI RAIL

***At Attractive Price***

Specially adapted for brick or asphalt paving. Let us have your inquiries, for above, or any weight rail, new or relayers.

***Our Prices Are Right***

**THE WILKOFF COMPANY**
**First National Bank Bldg., Pittsburgh, Pa.**
*Office and Yards:* **Youngstown, Ohio**
*New York Office:* **Woolworth Bldg.**

---

FOR SALE

## 4 Wason Paye Cars

28 ft. over corner posts
Standard O-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

---

## STREET CARS

**(4 ft. 8½ in. gage)**

**3—32 ft. Closed**

*Complete with equipment. First-class*
*Will convert to one-man type*

**4—9 Bench Open Trailers**

***Immediate Shipment***

**ZELNICKER IN ST. LOUIS**

*Get bulletin* 250 (250,000 *Cir.*), 88 *pages*
**Railway Power Plant & Industrial Equip.**

---

FOR SALE

## RAIL BONDS

260—New 4/0 **Flexible Copper Protected** Type P-4—⅞ x ⅞ inch press terminal 32 inches long. A bargain, apply to

**LYKENS VALLEY RAILWAY CO.**
417 East Market St., Williamstown, Pa.

---

## CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

***Get our List and Prices.***

**J. F. DONAHOO CO., Birmingham, Ala.**

---

No. 4 General Electric 73E box frame

## Railway Motors

complete with gears, pinions, gear cases, axle bearings, etc.

**No. 1 single end equipment,** type M, multiple unit control.

*Special Bargains.*

**TRANSIT EQUIPMENT COMPANY**
501 5th Ave., New York City

---

FOR SALE

Sixteen 33-in.

**Rolled Steel Wheels**

3-in. tread, ⅞-in. flange.

Also eight 67-tooth

**Grade M Gears**

and eight 17-tooth

**Grade M Pinions for GE-203-P Motors**

*This material is new and has never been used.*

**Gary & Valparaiso Railway Co.**
Gary, Indiana

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## WORRYLESS ELECTRICAL REPAIRS

On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc **Remember our initials stand for our product.**

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

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## FOR IMMEDIATE SHIPMENT

75 tons of 6-in., 62-lb. **Shanghai Relaying Rail,** practically as good as new, with angle bars to match Wire for quotation.

Also all other sections of **Standard Relaying Rail and a lot of Steel Girder and Deck Plate Bridges.**

**M. K. FRANK, Frick Bldg., Pittsburgh, Pa.**

# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

**Acetylene Service & Apparatus**
Oxweld Acetylene Co.

**Advertising, Street Car.**
Collier, Inc., Barron G.

**Air Rectifiers.**
Holden & White, Inc.

**Ammeters**
Weston Elec'l. Instrument Co.

**Anti-Climbers**
Railway Improvement Co.

**Anchors, Guy.**
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Automobiles and Buses.**
Brill Co., The J. G.
White Co., The

**Axle Straighteners.**
Columbia M. W. & M. I. Co.

**Axles.**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
General Steel Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Babbiting Devices.**
Columbia M. W. & M. I. Co.

**Badges and Buttons.**
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The

**Bankers and Brokers.**
Coal & Iron National Bank.

**Batteries, Storage.**
Electric Storage Battery Co.

**Bearings and Bearing Metals.**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co
General Electric Co.
Kerschner Co., Inc., W. R.
More-Jones Brass & M. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side.**
Holden & White, Inc.

**Bearings, Oil-less, Graphite, Bronze and Wood.**
Bound Brook Oil-less Bearing Co.

**Bells and Gongs.**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail.**
Niles-Bement-Pond Co.
Reading Specialties Co.
Watson-Stillman Co.
Western Electric Co.
Zelnicker Supply Company, Inc., Walter A.

**Blasting Powder & Equipment**
Du Pont de Nemours & Co., E. I.

**Boiler Tubes.**
National Tube Co.

**Boilers.**
Babcock & Wilcox Co.

**Bond Testers.**
American Steel & Wire Co.
Lincoln Bonding Co.

**Bonding Apparatus.**
Electric Railway Improvement Co.
Lincoln Bonding Co.
Ohio Brass Co.
Oxweld Acetylene Co.

**Bonding Tools.**
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail.**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Lincoln Bonding Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers**
Ronald Press Co.

**Boring Tools, Car Wheel.**
Niles-Bement-Pond Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Piling and Lumber.)**
Bates Expanded Steel Truss Co.
Creaghead Engrg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters.**
Holden & White, Inc.
Westinghouse Trac. Brake Co.

**Brake Shoes.**
American Brake S. & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Elec Truck Co.
Wheel Truing Brakeshoe Co.

**Brakes, Brake Systems and Brake Parts.**
Ackley Brake & Supply Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Taylor Elec. Truck Co.
Westinghouse Trac. Brake Co.

**Bridges and Buildings**
Thompson- Starrett Co.

**Brooms, Track, Steel or Rattan**
Paxson Co., J. W.
Zelnicker Supply Company, Inc., Walter A.

**Brushes, Carbon.**
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite.**
United States Graphite Co.

**Brush Holders.**
Anderson Mfg. Co., A. & J. M.
Eureka Co.

**Buckets.**
Blaw-Knox Co.

**Bushings, Case-Hardened Manganese**
Bemis Car Truck Co.

**Bushings, Graphite and Wooden.**
Bound Brook Oil-less Bearing Co.

**Bushings, Trolley Wheel**
Ives Co., The H. B.

**Cars, Dump.**
Differential Car Co.

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc., see those Headings.)**

**Car Trimmings. (For Curtains, Doors, Seats, etc., see those Headings.)**

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Thomas Perley A.
St. Louis Car Co.
Watson Mfg. Co.

**Cars, Second Hand.**
Electric Equipment Co.

**Cars, Self-Propelled.**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper.**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & M. Co.

**Castings, Gray Iron and Steel.**
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M I. Co.
St. Louis Car Co.
Standard Steel Works Co

**Castings, Malleable and Brass.**
American Brake S. & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley.**
Earll, C. I.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., C. N.

**Ceilings, Car**
Pantasote Co.

**Checks, Employees,**
American Railway Supply Co.

**Circuit Breakers.**
Cutter Co., The.
General Electric Co.
Westinghouse Elec. & M. Co.

**Clamps and Connectors, for Wires and Cables.**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co., The
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Cleaners & Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)**
Briill Co., The J. G.
Ohio Brass Co.
Western Electric Co.

**Clusters & Sockets.**
General Electric Co.

**Coal and Ash Handling. (See Conveying and Hoisting Machinery.)**

**Coasting Recorders**
Railway Improvement Co.

**Coil Banding and Winding Machines.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field.**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
King-Coil Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke & Kicking.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines.**
Electric Service Supplies Co.
International Register Co.
Johnson Fare Box Co.

**Commutator Slotters.**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., C. N.

**Commutator Truing Devices.**
General Electric Co.

**Commutators or Parts.**
Cameron Elec'l Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
King-Coil Mfg. Co.
Westinghouse Elec. & M. Co.

**Compressors, Air.**
General Electric Co.
Westinghouse Traction Brake Co.

**Concrete Mixers.**
Blaw-Knox Co.

**Condensers.**
General Electric Co.
Westinghouse Elec & M. Co.

**Conduits, Underground.**
Standard Underground Cable Co

**Connectors, Solderless.**
Westinghouse Elec. & Mfg. Co.

**Construction, Industrial**
Thompson-Starrett Co., The

**Contracting Engineers**
Thompson-Starrett Co.

**Controller Fingers**
Eureka Co., The

**Controller Regulators.**
Electric Service Supplies Co.

**Controllers or Parts.**
Assn. Mfrs. of Chilled Car Wheels
Columbia M. W. & M. I. Co.
Eureka Co., The
General Elcetric Co.
Triggerlock Reversible Controller Finger
Westinghouse Elec. & M. Co.

**Controlling Systems.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Converters, Rotary.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Conveyors, Belt**
Portable Machinery Co.

**Conveyors, Coal and Ash**
Portable Machinery Co.

**Conveyors, Portable**
Portable Machinery Co.

**Conveying and Hoisting Machinery.**
Columbia M. W. & M. I. Co.
Green Eng'g Co.

**Cord, Bell, Trolley, Register, Etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works.

**Cord Connectors and Couplers.**
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., C. N.

**Couplers, Car.**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. Brake Co.

**Cranes. (See also Hoists.)**
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets.)**

**Crossing Foundations.**
International Steel Tie Co.

**Crossing Signals (See Signals, Crossing.)**

**Crossings, Track. (See Track, Special Work.)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts.**
Canton Culvert & Silo Co.
Stark Rolling Mill Co.

**Curtains and Curtain Fixtures.**
Brill Co., The J. G.
Electric Service Supplies Co.
Pantasote
St. Louis Car Co.

**Cutting Apparatus Oxy-Acetylene**
Milburn Co., The Alex.
Oxweld Acetylene Co.

**Dealers' Machinery.**
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
Zelnicker Supply Co., W. A.

**Derailing Devices.**
Cleveland Frog & Crossing Co.

**Destination Signs.**
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Electric Service Supplies Co.

**Detective Service.**
Wish Service P. Edward

**Die Blocks**
General Steel Co.

**Dogs, Lathe.**
Williams & Co., J. H.

**Door Operating Devices.**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co

**Doors and Door Fixtures.**
Brill Co., The J. G.
Hale & Kilburn Corp.

**Doors, Folding Vestibule.**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers, Car.)**

**Drills, Track.**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Model 310**
**Single-Phase and D. C. Wattmeter**

One of the Portable Electrodynamometer Group, which also includes Model 329 Polyphase Wattmeter, Model 341 A. C. and D. C. Voltmeter, and Model 370 A. C. and D. C. Ammeter.

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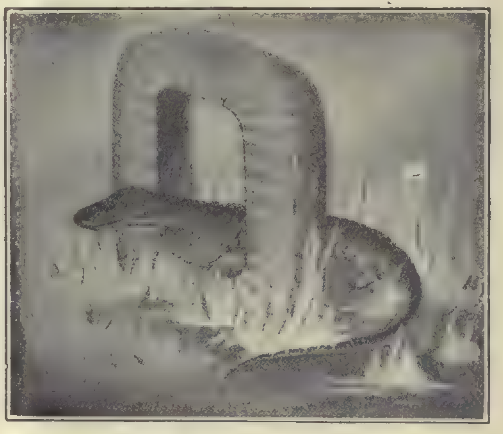

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# WHAT AND WHERE TO BUY

**Dryers, Sand.**
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., W. A.

**Electrical Wires and Cables.**
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating.**
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., H. M.
Clark Co., Management Corp., E. W.
Drum & Co., A. L.
Ford, Bacon & Davis
Holst, Engelhardt W.
Republic Engineers Inc.
Richey, Albert S.
Robinson, Dwight P.
Sanderson & Porter
Sargent & Lundy
Scofield Engineering Co.
Stone & Webster
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil.**
Westinghouse Elec. & M. Co.

**Fabricated Steel**
Blaw-Knox Co.

**Engines, Steam.**
Westinghouse Elec. & M. Co.

**Fare Boxes.**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The
Johnson Fare Box Co.
National Railway Appliance Co.
Ohmer Fare Register Co.

**Fences, Woven Wire and Fence Posts.**
American Steel & Wire Co.
Page steel & Wire Co.

**Fenders and Wheel Guards.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works
Wood Co., Charles N.

**Fibre and Fibre Tubing.**
Westingohuse Elec. & M. Co.

**Field Coils. (See Coils.)**

**Filters, Water.**
Scaife & Sons Co., Wm. B.

**Floodlights.**
Crouse-Hinds Co.
Electric Service Supplies Co.

**Flooring, Composition.**
American Mason Safety Tread Co.

**Forgings.**
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.

**Fuses and Fuse Boxes.**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.
Williams & Co., J. H.

**Fuses, Refillable.**
Columbia M. W. & M. I. Co.
Economy Fuse & Mfg. Co.
General Electric Co.

**Gages, Oil and Water.**
Ohio Brass Co.

**Gaskets.**
Power Specialty Co.
Westinghouse Trac. Brake Co.

**Gas-Electric Cars.**
General Electric Co.

**Gas Producers.**
Westinghouse Elec. & M. Co.

**Gates, Car.**
Brill Co., The J. G.

**Gear Blanks.**
Carnegie Steel Co.
Standard Steel Wks. Co.

**Gear Cases.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. M. Co.

**Gears and Pinions.**
Ackley Brake & Supply Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Ry. Appliance Co.
Nuttall Co., R. D.

**Generating Sets, Gas-Electric.**
General Electric Co.

**Generators.**
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Gongs. (See Bells and Gongs.)**

**Graphite.**
Morgan Crucible Co.

**Grates, Chain.**
Green Eng'g Co.

**Greases. (See Lubricants.)**

**Grinding Blocks & Wheels.**
Railway Track-work Co.

**Grinders and Grinding Supplies.**
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
Railway Track-work Co.

**Guards, Trolley.**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones Brass & M. Co.
Nuttall Co., R. D.
Star Brass Works

**Headlights.**
Crouse-Hinds Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Headlining**
Pantasote Co.

**Heaters, Car, Electric.**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water.**
Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car, Stove.**
Electric Service Supplies Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Hoists and Lifts.**
Columbia M. W. & M. I. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Yale & Towne Mfg. Co.

**Holders, Tool.**
Williams & Co., J. H.

**Hose Bridges**
Ohio Brass Co.

**Hydraulic Machinery.**
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Inspection.**
Elec'l Testing Laboratories

**Instruments, Measuring, Testing and Recording.**
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Weston Elec'l Instrument Co.

**Insulating Cloths, Paper and Tape.**
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Mitchell-Rand Mfg. Co.
Okonite Co.
Standard Paint Co.
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Insulation. (See Also Paints.)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Mitchell-Rand Mfg. Co.
Okonite Co.
Westinghouse Elec. & M. Co.

**Insulators. (See also Line Material.)**
Anderson M. Co., A. & J. M.
Creaghead Engrg. Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Macallen Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Insulator Pins.**
Electric Service Supplies Co.
Hubbard & Co.

**Inventions, Developed and Perfected.**
Peters & Co., G. D.

**Jacks. (See also Cranes, Hoists and Lifts.)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & I. Co.
National Ry. Appliance Co., Ltd.
Templeton, Kenly & Co., Ltd.
Watson-Stillman Co.

**Joints, Rail.**
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joint Co.
Reading Specialties Co.
Zelnicker Supply Co., Inc., W. A.

**Journal Boxes.**
Bemis Car Truck Co.
Brill Co., The J. G.

**Laboratories.**
Elec'l Testing Laboratories

**Lamp Guards and Fixtures.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Arc and Incandescent.**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & M. Co.

**Lamps, Signal and Marker.**
Ohio Brass Co.

**Lathes, Attachments.**
Williams & Co., J. H.

**Lathes, Car Wheel.**
Niles-Bement-Pond Co.

**Lighting Regulators, Car.**
Holden & White, Inc.

**Lights, Portable Carbide**
Milburn Co., The Alex.

**Lightning Protection.**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Engrg. Co.
Dick, Kerr & Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Macallen Co.
More-Jones Brass & M. Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Locks.**
Yale & Towne Mfg. Co.

**Locomotives, Electric.**
Brill Co., The J. G.
General Electric Co.
McGuire-Cummings Mfg. Co.
Westinghouse Elec. & M. Co.

**Lubricating Engineers.**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease.**
Borne, Scrymser Co.
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, Posts, etc.)**

**Machine Work.**
Columbia M. W. & M. I. Co.
Holden & White, Inc.

**Machine Tools.**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Manganese Parts.**
Bemis Car Truck Co.

**Metal Tokens**
Scovill Mfg. Co.

**Meters, Car, Watthour.**
Economy Electric Devices Co.

**Meters. (See Instruments.)**

**Mica.**
Macallen Co.

**Mirrors for Motormen.**
Drew Elec. & Mfg. Co.

**Motormen's Seats.**
Electric Service Supplies Co.
Wood Co., C. N.

**Motor Generator, Bonding and Welding.**
Lincoln Bonding Co.

**Motors and Generators Sets.**
General Electric Co.

**Motors, Electric.**
Dick, Kerr & Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Nuts and Bolts.**
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

**Ohmmeters**
Weston Elec'l. Instrument Co.

**Oil Storage Systems.**
Gilbert & Barber Mfg. Co.

**Oils. (See Lubricants.)**

**Overhead Equipment. (See Line Material.)**

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene.)**

**Packing.**
Power Specialty Co.
Westinghouse Trac. Brake Co.

**Paints and Varnishes. (Insulating.)**
Holden & White, Inc.
Mitchell-Rand Mfg. Co.
Standard Paint Co.

**Paints and Varnishes. (Preservative.)**
Standard Paint Co.

**Paints and Varnishes for Woodwork.)**
National Railway Appliance Co.

**Paving Bricks, Filler and Stretches**
Nelsonville Brick Co.

**Paving Material.**
American B. S. & Fdry. Co.
Nelsonville Brick Co.

**Pickups. (Trolley Wire.)**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., C. N.

**Pinions. (See Gears.)**

**Pins, Case Hardened, Wood and Iron.**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

**Pipe.**
National Tube Co.

**Pipe Fittings.**
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Trac. Brake Co.

**Pliers, Insulated.**
Electric Service Supplies Co.
National Railway Appliance Co.

**Pneumatic Hose.**
Westinghouse Trac. Brake Co.

**Poles, Concrete**
Massey Concrete Products Co.

**Poles, Metal Street.**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.
National Railway Appliance Co.

**Pole Sleeves.**
Drew Elec. & Mfg. Co.

**Poles, Ties, Posts, Piling and Lumber.**
Carney & Co., B. J.
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.
White Marble Lime Co.

**Poles and Ties, Treated.**
Lindsley Bros.
Page & Hill Co.
Valentine-Clark Co.

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Electric Service Supplies Co.
National Tube Co.
Nuttall Co., R. D.

**Pole Reinforcing.**
Hubbard & Co.

**Poles, Tubular Steel.**
Electric Railway Equipment Co.
National Tube Co.

**Power Saving Devices.**
Arthur Power-Saving Recorder Co.
Railway Improvement Co.

**Pressure Regulators.**
General Electric Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.

**Products, Concrete**
Massey Concrete Products Co.

**Pumps.**
Watson-Stillman Co.

**Punches, Ticket.**
American Railway Supply Co.
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., C. N.

**Punching Machinery.**
Watson-Stillman Co.

**Purifiers, Feed Water.**
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders.)**

**Rails, Relaying.**
Zelnicker Supply Company, Inc., Walter A.

**Rails, Steel**
Carnegie Steel Co.

**Rail Welding. (See Welding Processes and Apparatus.)**

**Rattan.**
Brill Co., The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Recorders, Power Saving.**
Arthur Power-Saving Recorder Co.

**Registers and Fittings.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

**Reinforcing Concrete.**
American Steel & Wire Co.
Carnegie Steel Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines.)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils, Armature and Field.)**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & W. Co.
King-Coil Mfg. Co.
Westinghouse Elec. & M. Co.

**Replacers, Car.**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialties Co.

**Resistance, Grid.**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube.**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley.)**

**Rheostats.**
General Electric Co.
Westinghouse Elec. & M. Co.

**Roofing Building.**
Standard Paint Co.

**Roofing, Car**
Pantasote Co.

**Sanders, Track.**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car.**
Brill Co., The J. G.

**Sash, Metal Car Windows.**
Hale & Kilburn Corp.

**Seating Material. (See also Rattan.)**
Brill Co., The J. G.
Pantasote Co.

**Seats, Car.**
Brill Co., The J. G.
Hale & Kilburn Corp.
Peters & Co., G. D.
St. Louis Car Co.

**Second-Hand Equipment. (See Searchlight Section.)**
Archer & Baldwin
Cleveland Armature Wks.
Duquesne Elec. & Mfg. Co.
Electric Equipment Co.
Exell Mfg. Co.
Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
Kerschner Co., Inc., W. R.
MacGovern & Co.
Zelnicker Supply Co., W. A.

**Shades, Vestibule.**
Brill Co., The J. G.

**Shovels.**
Hubbard & Co.

**Shovels, Power.**
Allis-Chalmers Mfg. Co.

**Signals, Car Starting.**
Electric Service Supplies Co.
Consolidated Car Heating Co.
National Pneumatic Co.

**Signals, Highway Crossing.**
U. S. Electric Signal Co.

**Signal Systems, Block.**
Electric Service Supplies Co.
Federal Signal Co
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., C. N.

**Slack Adjusters. (See Brake Adjusters.)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters.**
Anderson M. Co., A. & J. M.
Bonney-Vehslage Tool Co.
Columbia M. W. & M. I. Co.
Drew Elec. & Mfg. Co.
Electric Railway Equipment Co.
Holden & White, Inc.
More-Jones Brass & M. Co.
Nuttall Co., R. D.

**Snow-Plows, Removers, Sweepers, etc.**
Brill Co., The J. G.
Consolidated Car Fender Co.
Columbia M. W. & M. I. Co.

**Soldering and Brazing Apparatus. (See Welding Proc. & App.)**

**Solderless Connectors**
Westinghouse Elec. & Mfg. Co.

**Speed Indicators.**
Wood Co., C. N.

**Spikes.**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds.**
Standard Woven Fabric Co.
Westinghouse Elec. & M. Co.

**Splicing Sleeves. (See Clamps and Connectors.)**

**Springs, Car & Truck.**
American Steel & Wire Co.
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Taylor Elec. Truck Co.

**Sprinklers, Track and Road.**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Steel Forms**
Blaw-Knox Co.

**Steps, Car.**
American Mason S. T. Co.
Universal Safety Tread Co.

**Stokers, Mechanical.**
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & M. Co.

**Storage Batteries. (See Batteries, Storage.)**

**Strand.**
Roebling's Sons Co., J A.

**Straps, Car, Sanitary.**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See also Bridges.)**

**Superheaters.**
Babcock & Wilcox
Locomotive Superheater Co.
Power Specialty Co.

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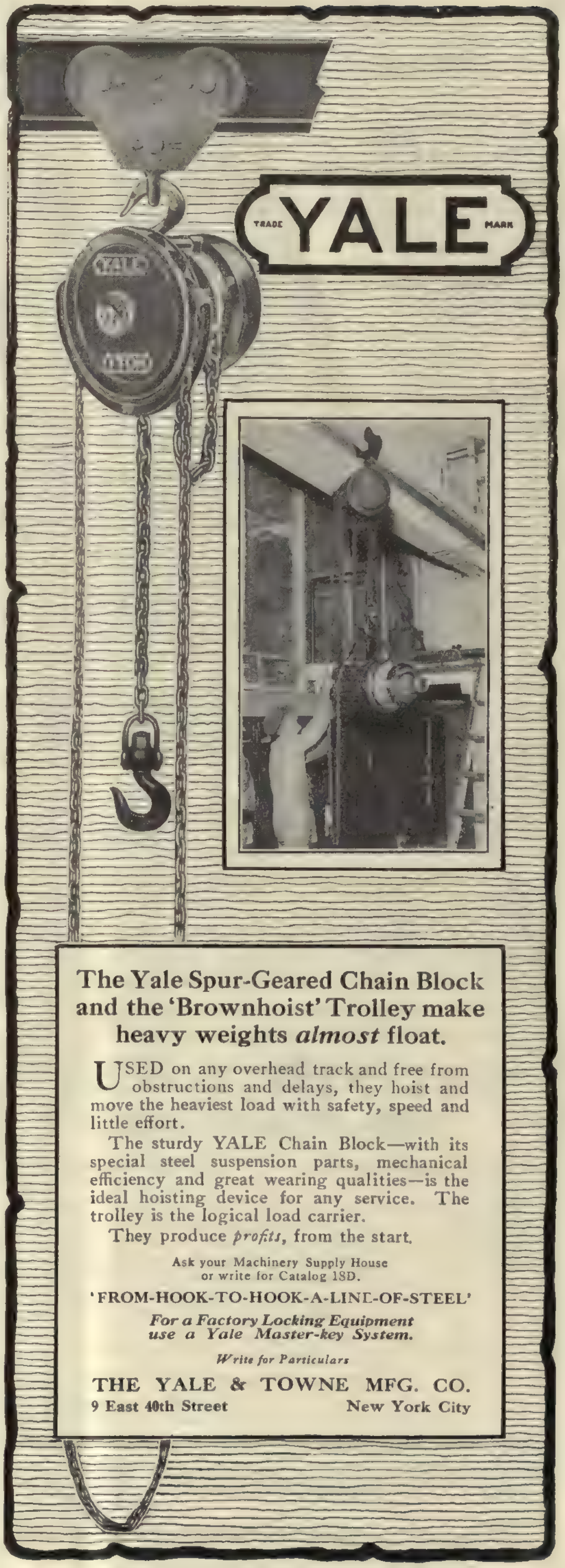

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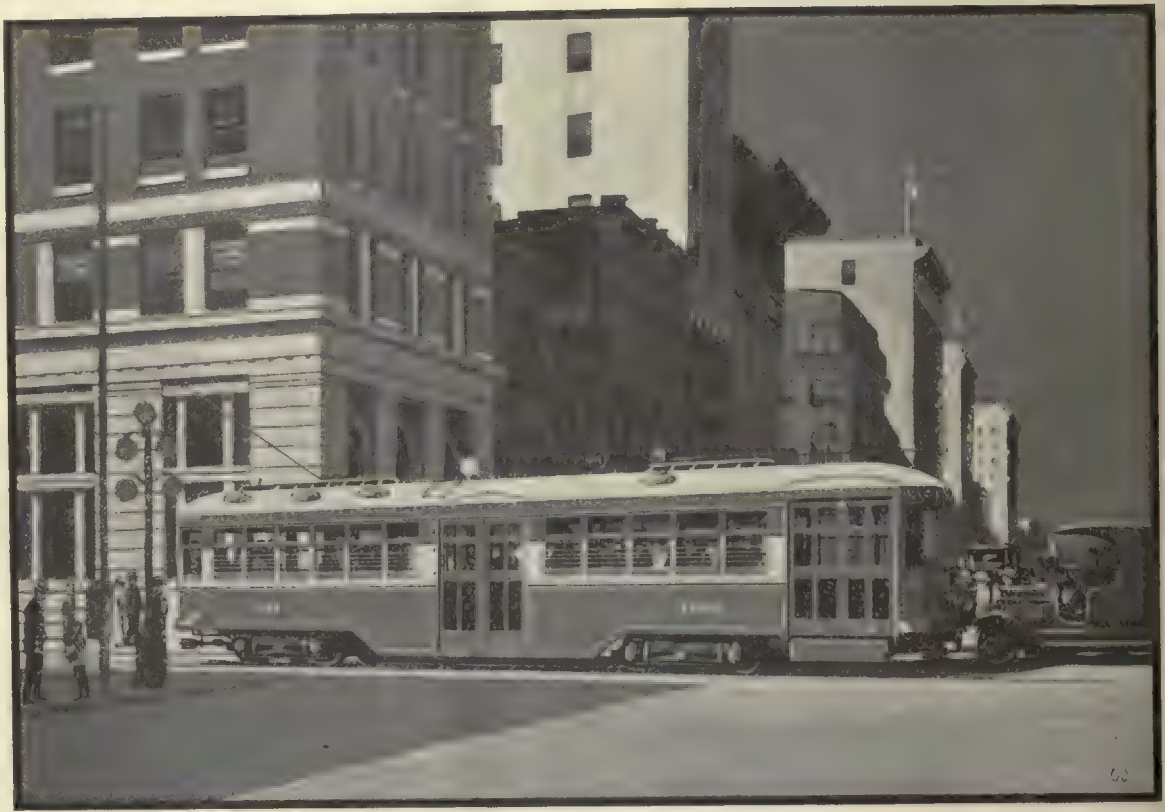

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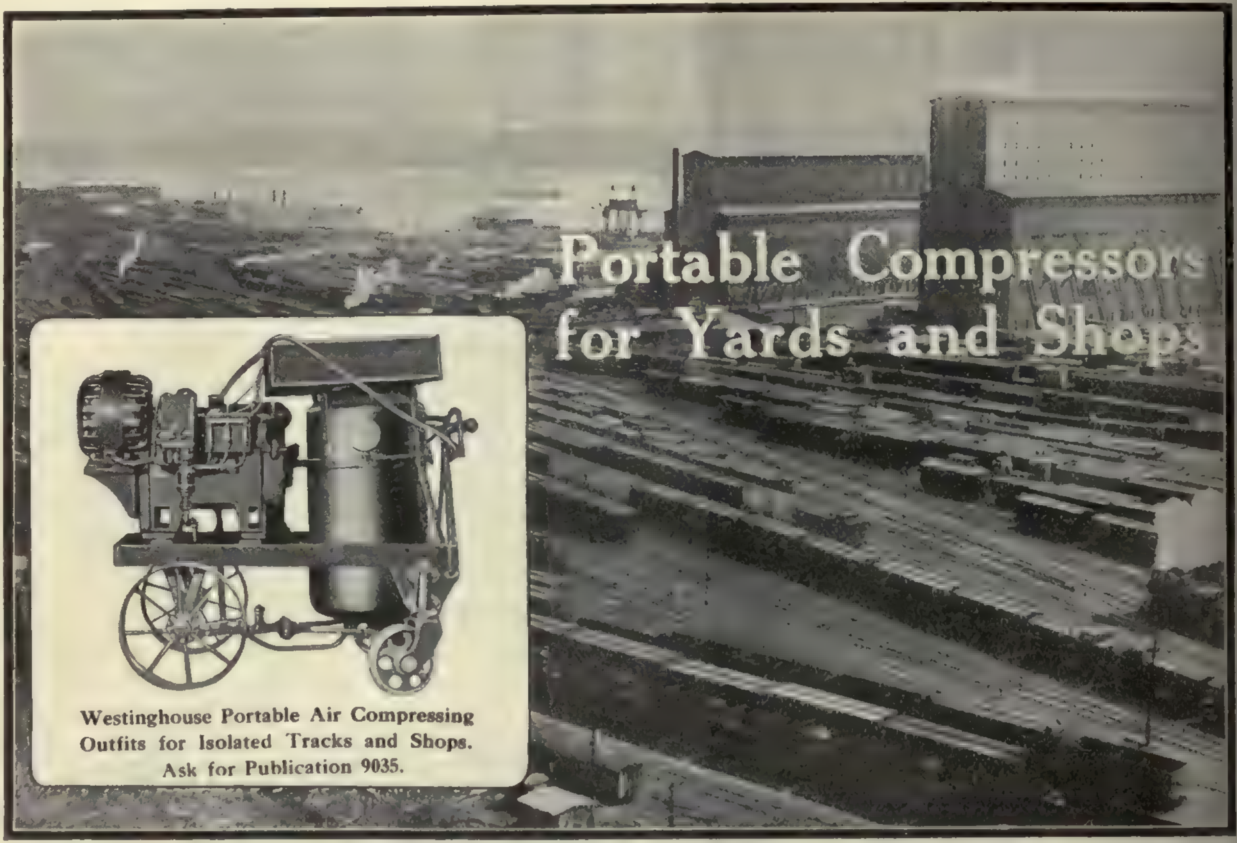

Westinghouse Portable Air Compressing Outfits for Isolated Tracks and Shops. Ask for Publication 9035.

Isolated yard tracks and smaller shops are often denied compressed air because they are located remote from the central plant.

## Westinghouse Portable Air Compressing Outfits,

which can be wheeled anywhere at will and be plugged in on any light or power circuit, will supply compressed air for all such purposes.

*Brake Building our Business for a Lifetime.*

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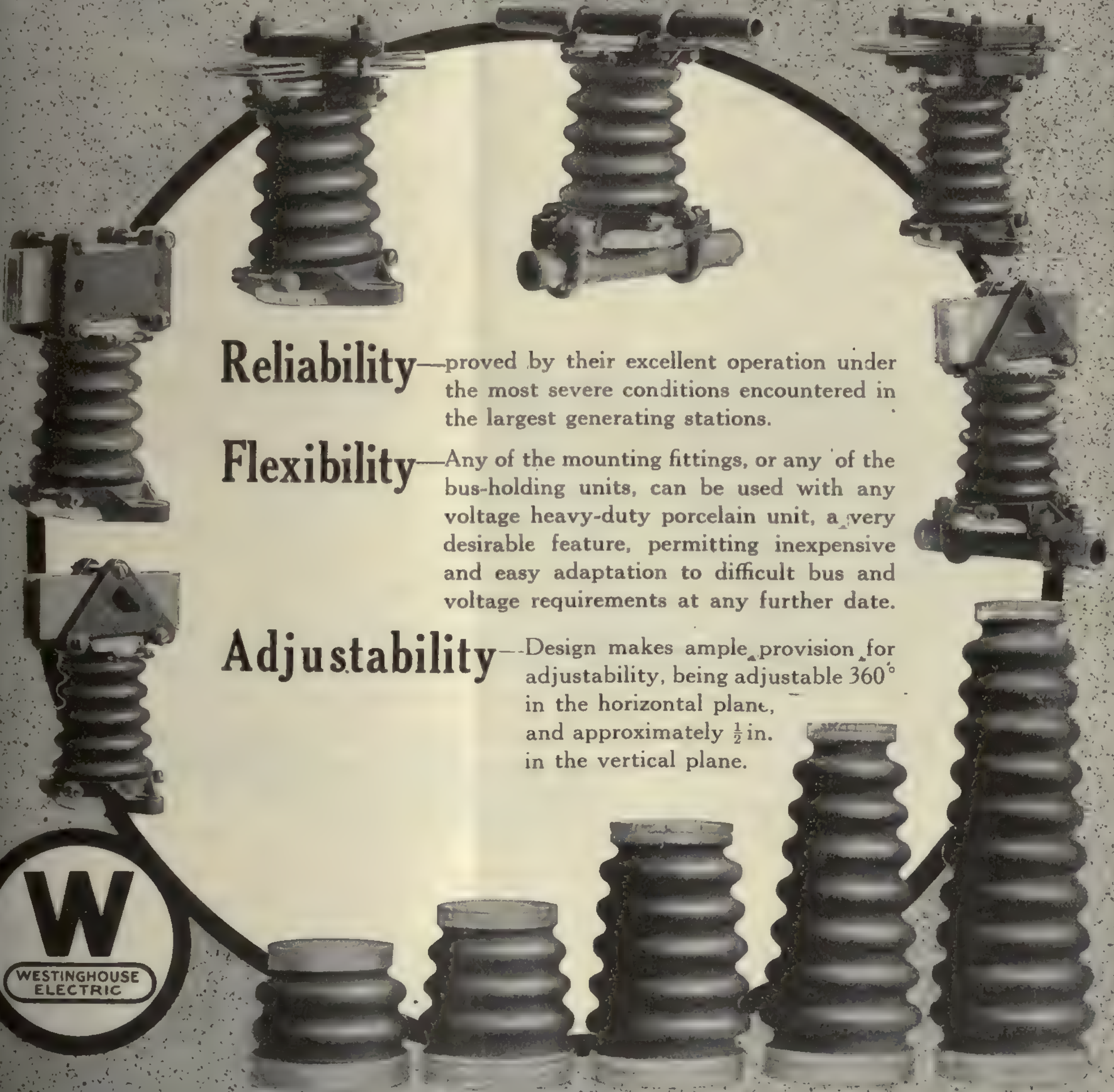
Pillar-Insulator, Front-Connected Type For Heavy Duty

A Complete Line, 7,500 to 66,000 Volts.



**Reliability**—proved by their excellent operation under the most severe conditions encountered in the largest generating stations.

**Flexibility**—Any of the mounting fittings, or any of the bus-holding units, can be used with any voltage heavy-duty porcelain unit, a very desirable feature, permitting inexpensive and easy adaptation to difficult bus and voltage requirements at any further date.

**Adjustability**—Design makes ample provision for adjustability, being adjustable 360° in the horizontal plane, and approximately ½ in. in the vertical plane.

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Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

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# The Safety Car

## In a City of 75,000

| | Was | Is |
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| Cost of power per car mile.......... | 3c | 1.15c |
| Platform cost ...................... | 6.35c | 4.02c |
| Net return per car mile............. | 0.2c | 4.9c |
| Operating ratio .................... | 98.5% | 57.5% |

Even after charging the cost of electric switches against the Safety Car operation, the user says:

> *"Our net investment in the Safety Car is returning to us 86% on the investment."*

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When equipped with automatic laborless apparatus, so interlocked that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

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DEVICES COMPANY

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St. Louis

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Ry. Exch. Bldg.

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PITTSBURGH
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*Quality First*

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Tomlinson Couplers take care of the severe breaks in grade so common in electric railway construction, and they are the only automatic couplers which do this successfully.

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All Tomlinson Couplers couple automatically by impact and are uncoupled from the side of the car.

## Tomlinson M. C. B.

(Patented)

Intercouples with any standard M.C.B. Coupler.

Scores of interurban roads which interchange with steam roads are equipped with Tomlinson M.C.B. Couplers.

Tomlinson M.C.B. on Interurban Motor Car.

Tomlinson Form 16 Air Connecting Coupler

## Tomlinson Form 16

(Patented)

Connects car and air automatically and simultaneously. Coupler faces are flat.

Tomlinson Form 16 is largely used on elevated, subway and heavy interurban service.

## Imperial Incandescent Headlights

Far down the track the Imperial Type SDS sends a powerful shaft of light which picks up obstacles in time for a safe stop and effectually warns traffic.

Imperial Headlights are sturdy, simple, dust and weather proof.

Imperial Type SDS
Incandescent Headlight

## The Ohio Brass Company

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## The Ideal Wire for Live Suburban Lines

A live suburban line is the ideal place for Phono-Electric trolley wire.

As traffic on such a line is constantly increasing, it is highly desirable that the original current-carrying capacity of the trolley wire be sufficient for years to come.

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And, of course, there will be no breaks!

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**Bridgeport Connecticut**

Concreting 1330 ft. of Track Daily
with

# INTERNATIONAL
## STEEL TWIN TIES

200 cubic yards of concrete are being mixed and placed in 10 hours by a gang of twenty-five men on a number of Street Railway properties.

Steel Twin Tie track requires only 15 cubic yards of concrete per 100 feet of track. Therefore, the gang mentioned above can concrete completely 1330 ft. of Twin Tie track in ten hours.

Steel Twin Tie economies solve the vital problem of saving money on enforced construction with labor and materials at high price levels. Get full particulars before you lay any track.

## THE INTERNATIONAL STEEL TIE COMPANY

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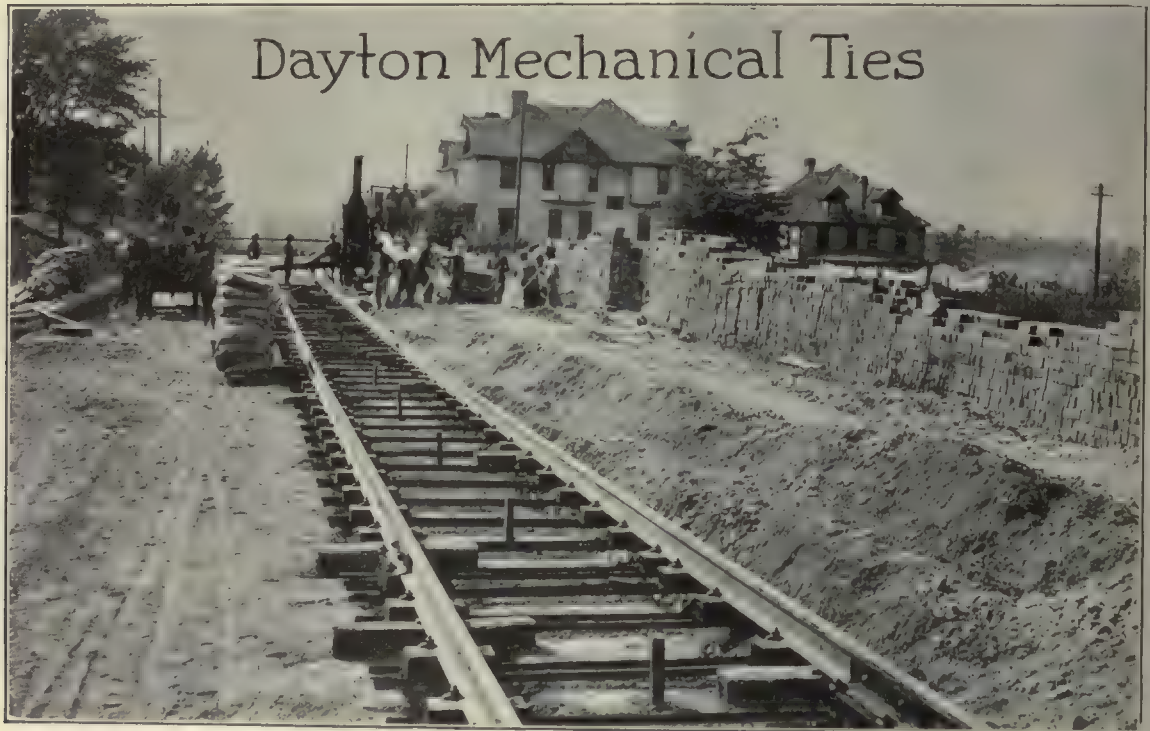
GENERAL SALES OFFICE AND WORKS: CLEVELAND, OHIO

# The MECHANICAL RAILWAY TIE



# Meet That One Overwhelming Demand—Keep Down Costs!

To *keep down costs* is a vital necessity today. WHAT costs? Clearly many miles of track need rejuvenation—and clearly the first cost, while a most important item, must be weighed against final costs. Compare, for instance, Dayton Mechanical Ties with untreated wood ties. The installation cost of the former, labor included, is a *great deal less* than the wooden ties in a gravel ballast. And you can install Dayton Ties in a CONCRETE roadbed, at that, and still gain marked ECONOMY in first cost. We only touch lightly on final costs—because service has demonstrated beyond argument that Dayton Mechanical Ties are PERMANENT, with the lowest maintenance figures of any form of trackwork.

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**THE DAYTON MECHANICAL TIE CO.**
**704 Commercial Bldg.**
**DAYTON, OHIO**

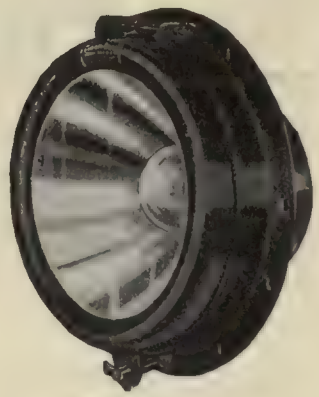
For Interurban Service

# "GOLDEN GLOW"

For Interurban Service

For City Service

## RAILWAY HEADLIGHTS



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***Write for more information.***

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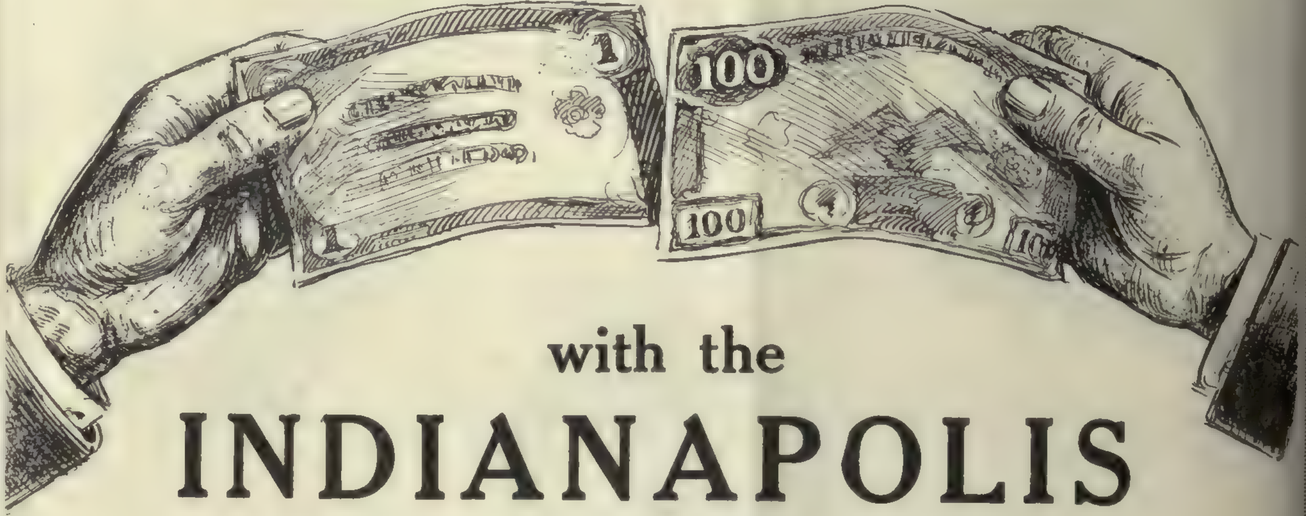

## with the

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It costs from one to two dollars to save one hundred dollars on reclaiming worn and broken switchpieces, frogs, crossings, etc. Labor, current and steel amount to only 1 per cent. to 2 per cent. of the value of the reclamation.

Track may be old and worn and look as if its days of service are past, but the Indianapolis Welder will build up the weak spots and make the rails good as new. Indianapolis Portable Electric Welders have doubled the life of rails for hundreds of leading railways.

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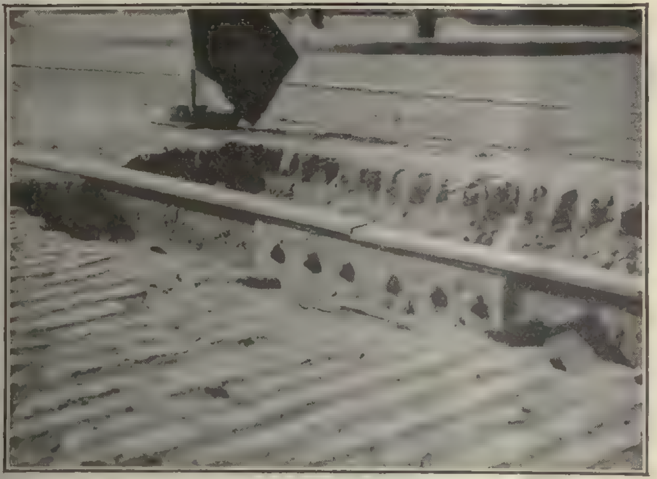

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## Remedied with the

# Reciprocating Track Grinder

—and it can be done cheaply and quickly. Other types of machines have been tried on similar work and found unsatisfactory.

To let this joint go unchanged would soon mean new plates and new rail. Several like joints would mean the early replacement of long stretches of track.

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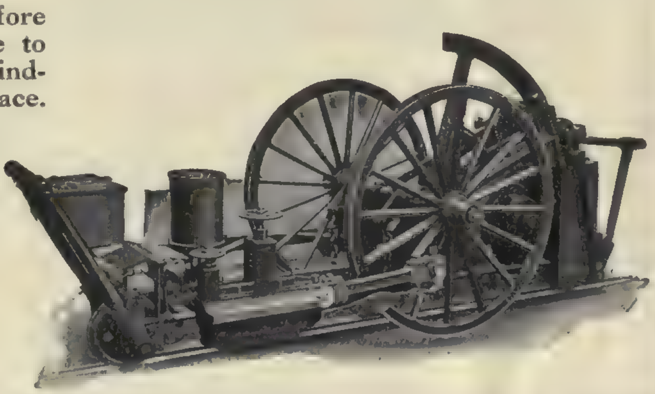


# Do You Know What Causes RAIL BREAKAGE?

*"Ninety per cent. of the rail failures can be divided into two general classes,"* says M. H. Wickhorst, discussing a report of the rail committee of the American Railway Engineering Association. *"First, crushed and split heads, and second, broken bases. The latter can usually be traced to a seam in the bottom of the base. Fifty per cent. of the rail problem consists in getting sound metal of even composition, and 40 per cent. consists in so rolling steel as to avoid seams in the base."*

A series of minute seams exists in the surfaces of all rails made in the ordinary way, these seams being principally in the head and base. The seamy base, however, is the dangerous part, because seams at this point may, after the rail has seen more or less service, develop into longitudinal cracks, which ultimately lead to complete failure of the rail. The output of an individual mill may at times approach nearer the desired state of excellence, but heretofore the seams have invariably been present. The prevalence of such seams is illustrated by Figure 1, which shows a typical etched rail surface. Past attempts to eliminate this defective surface have failed because of a condition inherent in the ordinary process of steel making and beyond the control of the manufacturer.

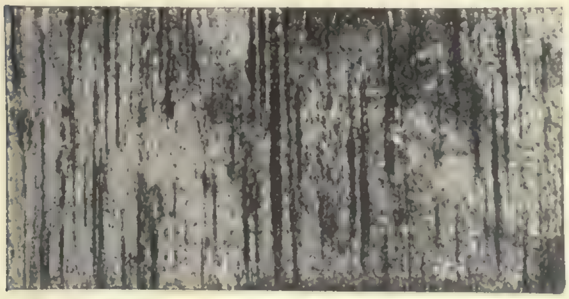


Fig. 1—Full sized portion of typical rail base, etched to show prevalence and magnitude of longitudinal seams.

The defects originate while the molten metal is being poured from the ladle into the ingot mold. Air entrapped against the sides of the mold by the rising metal forms small disc-like apertures or flaws on the surface of the ingot. Figure 2 shows many of these indentations as they appear on the face of an ingot.

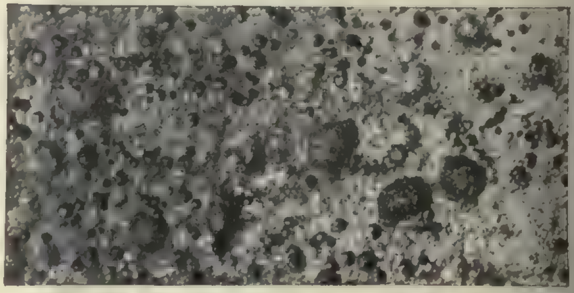


Fig. 2—Full sized surface section of an ingot, showing the disc-like surface flaws.

There is also a partially decarburized (and therefore softer) surface about 5/16 of an inch in depth enveloping the ingot on all four sides, and varying from 8 to 10 points lower in carbon than the metal immediately underneath. This weak, defective and partially decarburized envelope is undoubtedly produced in the soaking pits, where there is so much oxidation that a thick oxide is always formed on the surface of the ingot. That such a layer of lower carbon steel actually exists is shown in Figure 3, which represents part of an ingot section machined, polished and etched. This sample was taken after the ingot had been introduced into the soaking pit and heated to a rolling temperature, but not rolled. This ingot also showed the characteristic disc-like indentations as well as the decarburized surface on its outside faces at the time it was ready to be rolled.

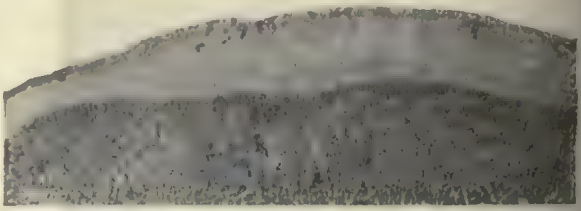
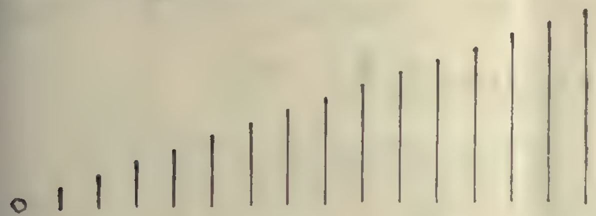


Fig. 3—Section of ingot machined, polished and etched to show surface shell of weak and partiallly decarburized metal.

The development of the surface flaws or holes into seams on the finished rail is indi-

Fig. 4—Showing the progressive formation of a seam from an air hole in the surface metal, as developed in fifteen passes through the rolls



cated in Figure 4. Starting as the spot shown on the left, the disc-like aperture is gradually changed in the reducing drafts of the rolls until it becomes a finely drawn outline or seam.

During the rolling operation, the partially decarburized surface of the four faces of the ingot, which averages 5/16 of an inch in thickness, becomes gradually thinner as the reducing drafts elongate the metal, so that in the finished bar this softer, weaker layer of metal varies from .01 to .04 inches in thickness. It is this soft surface that under the cold rolling action of the wheels causes rail heads to slough off in service and form fins.

The surface seams, running as they do in a longitudinal direction, tend to weaken the rail section against cross stresses. (The action and direction of stresses in a rail in service, especially in the rail base, are alternately longitudinal and transverse.) When the stresses are transverse, or at right angles to the direction of the seams, a rupture often results that follows along the seam, ultimately leading to partial or complete fracture.

Here is the way a prominent authority puts it: *"Rails strained in a crosswise direction fracture with great brittleness, when, for example, the flanges are bent crosswise.*

*"So far as known, there is no material difference between the streaks and laminated seams of the head and those of the base, excluding those of the base which chance to have their origin in laps during rolling. Wherever there is a lack of structural continuity in the steel, brittleness may prevail when the steel is overstrained at right angles to that discontinuity. Overstraining more readily occurs in the base or in the flanges of the base than in the head of the rail; that is, the stresses may more readily reach the necessary maximum in the base. For this reason, probably, flange breaks are more numerous than split heads. Defects in the base are of a more grave character and lead to more rail fractures than defects which are in the head. Incipient longitudinal cracks have also been found in the heads of rails, and those incipient cracks have been on the lines of streaks."*

These conditions, which are by no means exaggerated, explain why all rail makers have sought for many years to roll their products free from seams and other surface defects. The only practical solution that has ever been offered is the Lackawanna Deseaming Process, originated and controlled exclusively by us and applied to all Lackawanna Rails of 50-pound per yard and heavier section.

Watch for our next announcement, which will discuss further details and explain benefits that no first-class railroad can afford to neglect.

If you need new rails, send for and read our book, "The Lackawanna Deseaming Process," which will give you valuable points that ought to be included in your specifications.

## All Lackawanna Rails Are Deseamed

***Other Lackawanna Aids to Better Track: The Lackawanna Safety-Head Angle Bar, The Lackawanna Hook-Shoulder Tie Plate, Lackawanna Track Bolts and Spikes, The Abbott Rail-Joint Plate. Write for our booklet, "Improved Track Appliances."***

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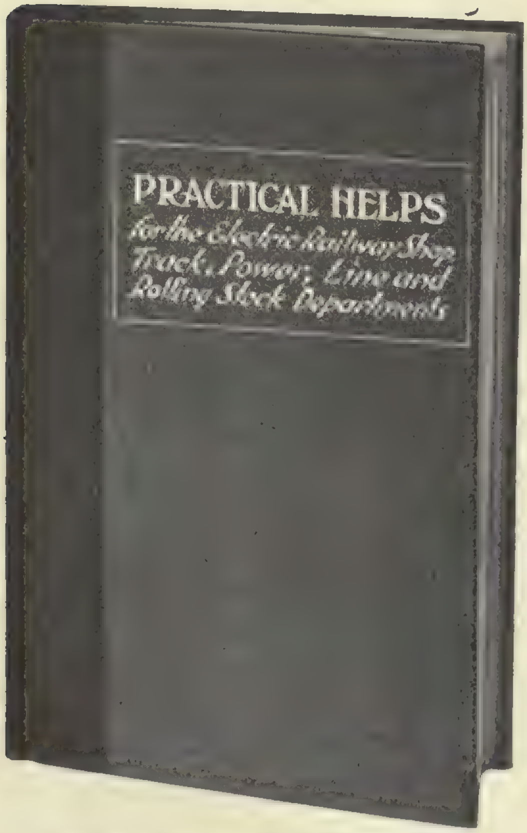

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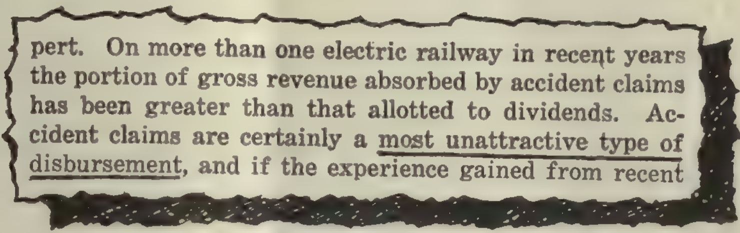

pert. On more than one electric railway in recent years the portion of gross revenue absorbed by accident claims has been greater than that allotted to dividends. Accident claims are certainly a most unattractive type of disbursement, and if the experience gained from recent

*Elec. Ry. Journal*

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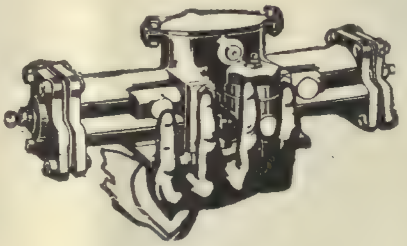

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6—Pouring the Steel
7—Removing the Molds
8—Grinding the Mold
9—Maintaining Traffic
10—Inspection trip

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in

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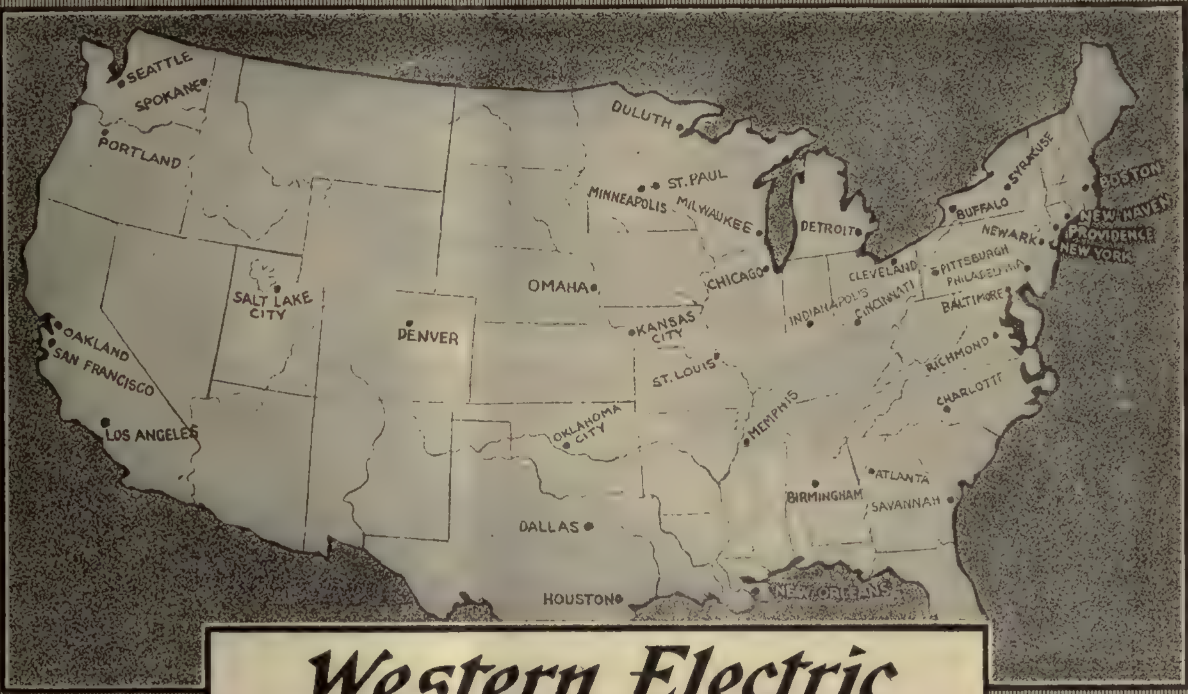
To the steam railroad man facing the problem of electrification we have only this to say: Whenever an experienced user of insulators thinks of *good* insulators—the BEST insulators—he thinks of VICTOR. And remember this—no item is more vitally important to successful electric operation than the *insulators*. Victors insure SUPER-PROTECTION.

**THE LOCKE INSULATOR MFG. CO., Victor, N. Y.**

# FOR SERVICE THAT IS EXCEPTIONAL



## *Western Electric*
## QUALITY PRODUCTS

Forty Distributing Points Each Maintaining
Complete Stocks and Service Staffs

## FOR THE ELECTRIC RAILWAY

The Western Electric Company offers an exceptional service to electric railway companies for electrical equipment of every type.

There is a well-stocked distributing point near at hand to the lines of your road in forty of the principal cities of the United States.

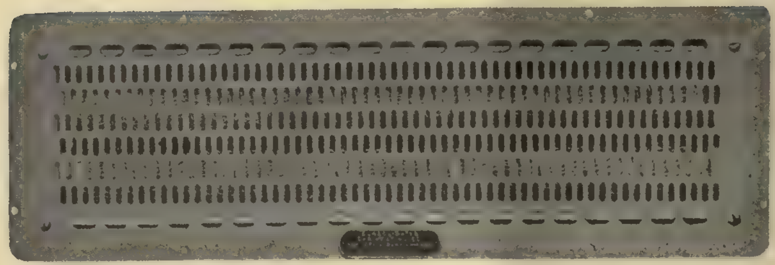
Western Electric stocks cover such items as cedar, chestnut, cypress and creosoted yellow pine poles; cross-arms; brackets; pins; insulators; wire; pole line hardware and tools for the outside wire plant. Our stocks also cover telephones and telephone accessories for telephone dispatching; flood lamps, for furnishing "safe electric daylight" on night work—in fact, equipment for every electrical need.

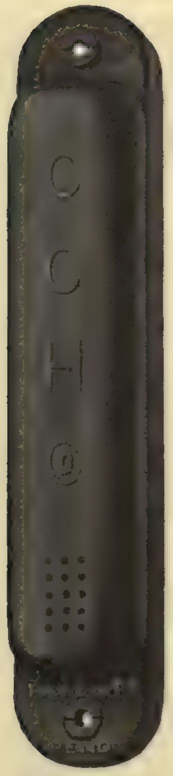
Wherever Western Electric Quality Products are used for railway work, the utmost in service is assured. The Western Electric Company has manufactured electrical equipment of the highest type for nearly fifty years—and knows how.

***Our nearest house is ready to serve you***

***Western Electric Company***
INCORPORATED
**Offices in All Principal Cities**

Panel Type Electric Heater





Thermostat

Pneumatic Door Engine

Thermostat

Cab Heater

*Steam Road electrification implies familiarity with*

# CONSOLIDATED

Car heaters and thermostatic control for electric heaters.

Pneumatic door engines, with manually or electrically controlled valves.

Motorman's Signal Light System.

Safety Starting and Stopping Appliances.

Electric heaters for offices, turntable cabs, crane cabs and pump houses with automatic control to prevent freezing.

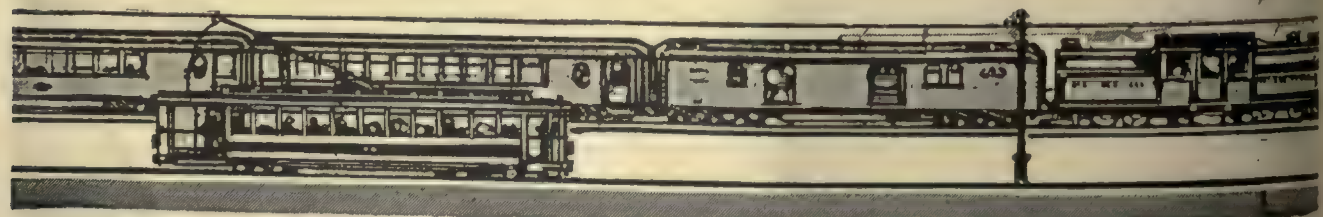
For Steam Service: Improved steam couplers, quick opening, straight port end train pipe valves, admission valves, traps, etc.

We are at your service in connection with all problems of heating and also those involving door operation, with starting and stopping safety features.

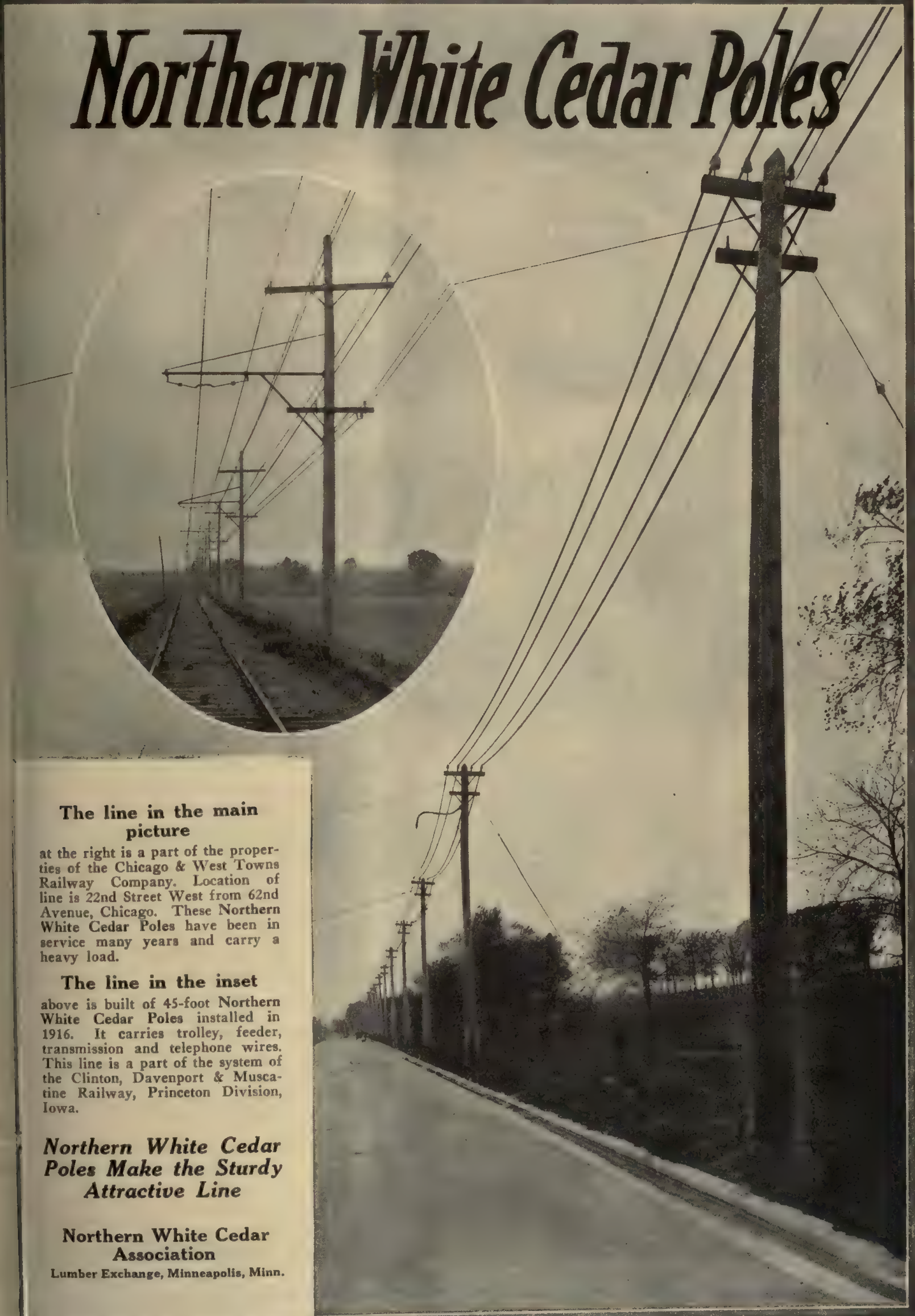
*"Consolidated Means Reliable and Economical"*

## CONSOLIDATED CAR-HEATING CO.

ALBANY NEW YORK CHICAGO



# Northern White Cedar Poles



### The line in the main picture

at the right is a part of the properties of the Chicago & West Towns Railway Company. Location of line is 22nd Street West from 62nd Avenue, Chicago. These Northern White Cedar Poles have been in service many years and carry a heavy load.

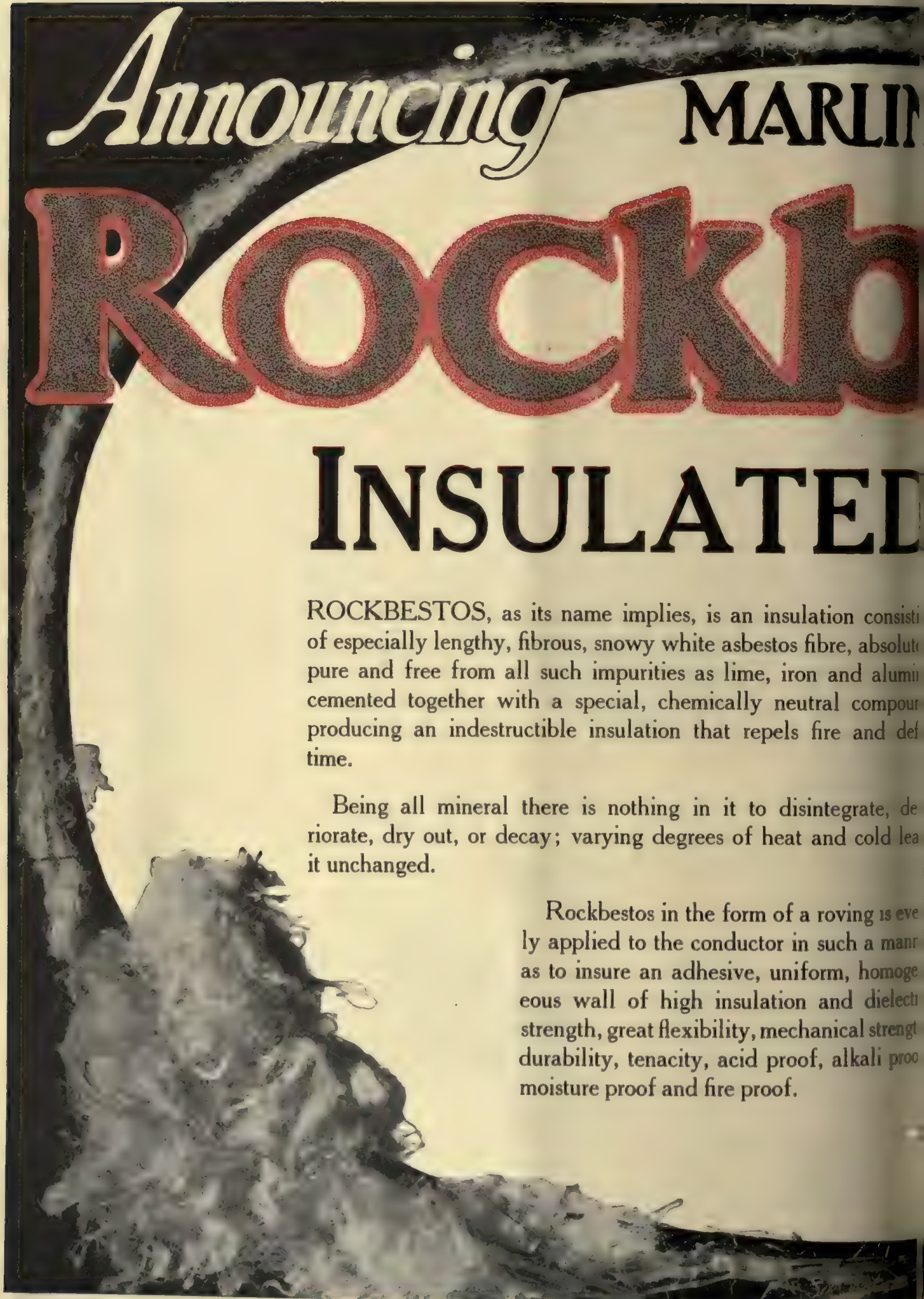
### The line in the inset

above is built of 45-foot Northern White Cedar Poles installed in 1916. It carries trolley, feeder, transmission and telephone wires. This line is a part of the system of the Clinton, Davenport & Muscatine Railway, Princeton Division, Iowa.

***Northern White Cedar Poles Make the Sturdy Attractive Line***

**Northern White Cedar Association**

**Lumber Exchange, Minneapolis, Minn.**



Announcing MARLI

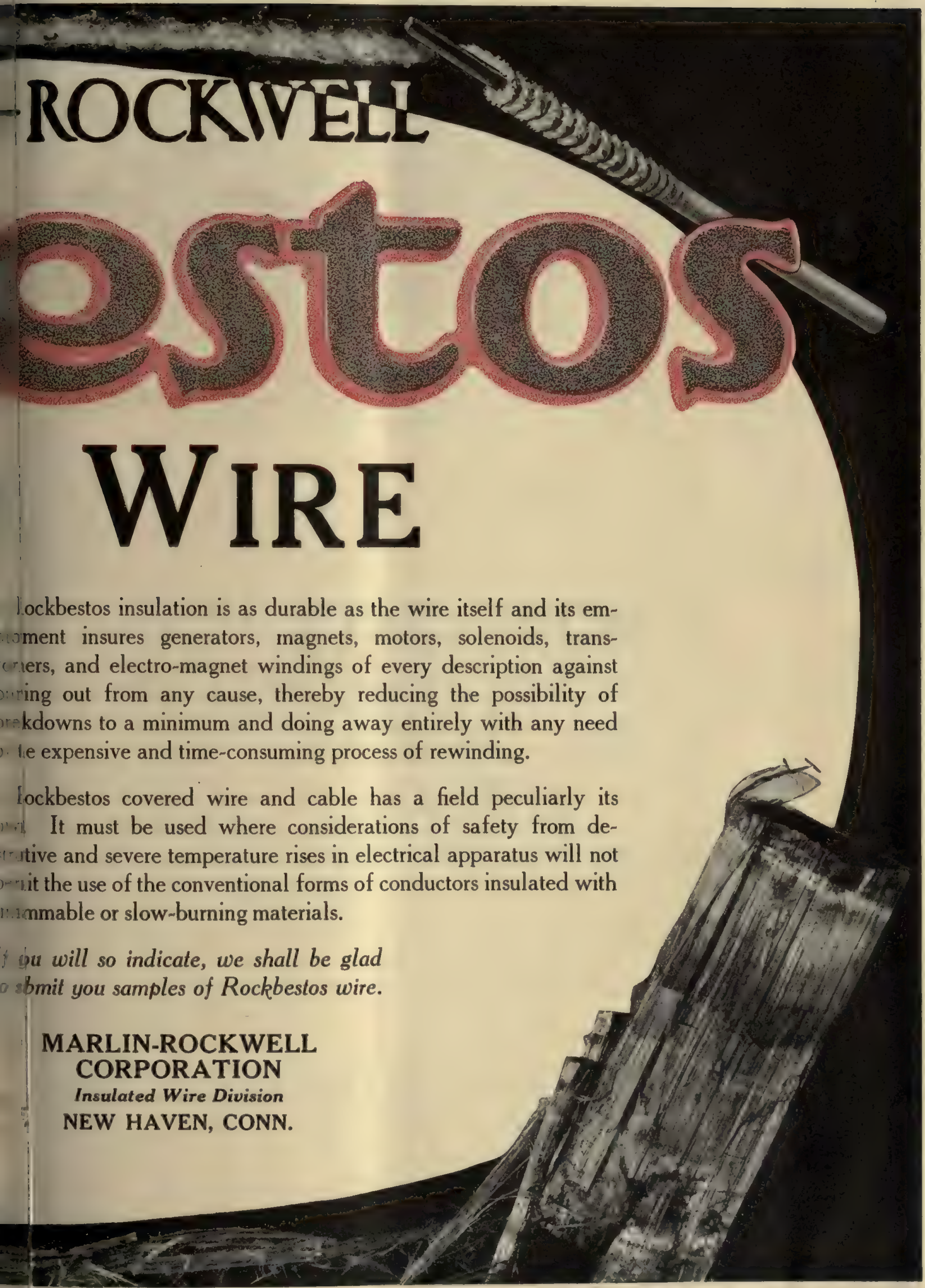
Rockb

INSULATE

ROCKBESTOS, as its name implies, is an insulation consisti of especially lengthy, fibrous, snowy white asbestos fibre, absolut pure and free from all such impurities as lime, iron and alumi cemented together with a special, chemically neutral compour producing an indestructible insulation that repels fire and def time.

Being all mineral there is nothing in it to disintegrate, de riorate, dry out, or decay; varying degrees of heat and cold lea it unchanged.

Rockbestos in the form of a roving is eve ly applied to the conductor in such a manr as to insure an adhesive, uniform, homoge eous wall of high insulation and dielectr strength, great flexibility, mechanical strengt durability, tenacity, acid proof, alkali proo moisture proof and fire proof.



# -ROCKWELL

# estos

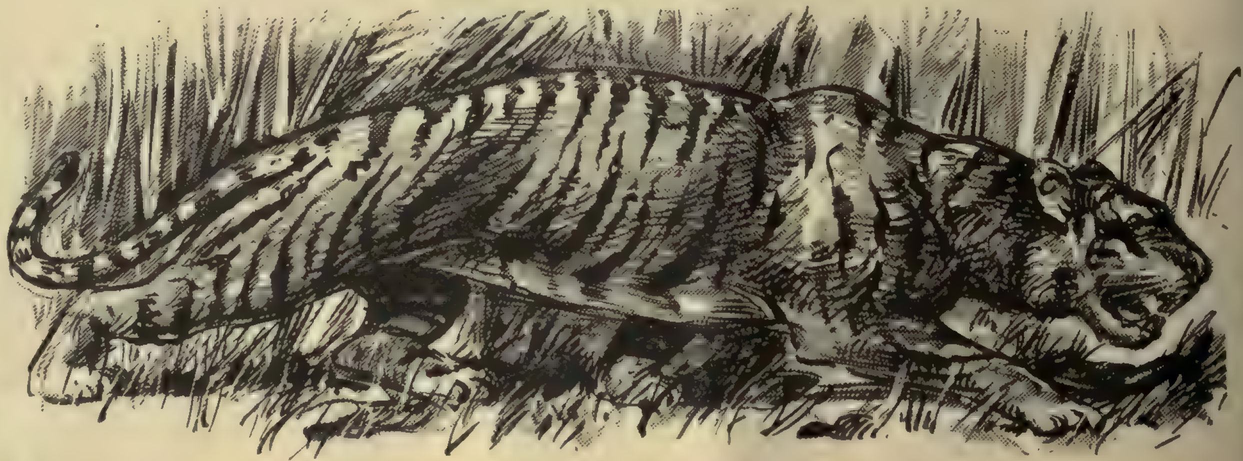
# WIRE

ockbestos insulation is as durable as the wire itself and its em-
ment insures generators, magnets, motors, solenoids, trans-
ers, and electro-magnet windings of every description against
ring out from any cause, thereby reducing the possibility of
kdowns to a minimum and doing away entirely with any need
e expensive and time-consuming process of rewinding.

ockbestos covered wire and cable has a field peculiarly its
It must be used where considerations of safety from de-
tive and severe temperature rises in electrical apparatus will not
it the use of the conventional forms of conductors insulated with
mmable or slow-burning materials.

*ou will so indicate, we shall be glad*
*bmit you samples of Rockbestos wire.*

**MARLIN-ROCKWELL**
**CORPORATION**
***Insulated Wire Division***
**NEW HAVEN, CONN.**



# *Leave Nothing to Chance*

—or chance may leave you—in a hole.

It pays to give careful study to the question of bearings—to eliminate hit-or-miss practices and specify only according to known and established merit.

Your choice will settle on

**MORE-JONES**
**"TIGER" BRONZE**
**AXLE AND ARMATURE**
**BEARINGS**

In "Tiger" Bronze Bearings you get the benefit of all we have learned about bearing metal in over forty years of foundry experience; plus the best and purest material; plus a special method of casting.

The proof of their superiority is found in the records they have made for consistently reliable, long-wearing, anti-frictional service.

***Further information and prices on application.***

**More-Jones Brass and Metal Co.**
St. Louis, U. S. A.

Manufacturers of

***Trolley Wheels and Harps, Contact Springs, Motor Axle Bearings, Armature Bearings, Truck Journal Bearings, Air Compressor Bearings, Armature Babbitt Metal and similar products***

Five Little Giant Electric Track Drills reaming joint holes on the tracks of the Pittsburgh Railways Co. These five are part of a big battery of Little Giant Portable Electric Tools, saving time, labor and money for this prominent user.

# Little Giant Track Drills

## *Help You Keep Track Upkeep Down!*

Little Giant Track Drills (standard type) are built for rapid work in rail bonding, drilling tie and joint holes, and for reaming joint holes. Note that the frame does not *bolt* to the track; it simply *hooks* over the rail to be drilled, the operator holding down the other end by sitting on the seat provided. Other features provide for the quick, simple application and operation of the drill for *any* nature of track drilling work.

These are times for *super* efforts toward economy. You are losing money on every track drilling job you handle without Little Giant Track Drill's aid!

Built in two sizes for maximum drilling of 1 in. and 1½ in. holes. *Have you received our new bulletins?*

**The Little Giant Track Drill is just one of a *family* of portable electric labor-savers. There are Little Giant Portable Electric Grinders, Portable Electric Spike Drivers, Portable Electric Hammer Drills, etc. Write for complete illustrated Bulletins.**

## Chicago Pneumatic Tool Company

1062 Fisher Building

New York Chicago San Francisco

*Branches all over the world*

"Chicago Pneumatic" Products

Pneumatic Tools
Electric Drills
Air Compressors
Oil, Gas and Steam Engines
Vacuum Pumps
Rock Drills

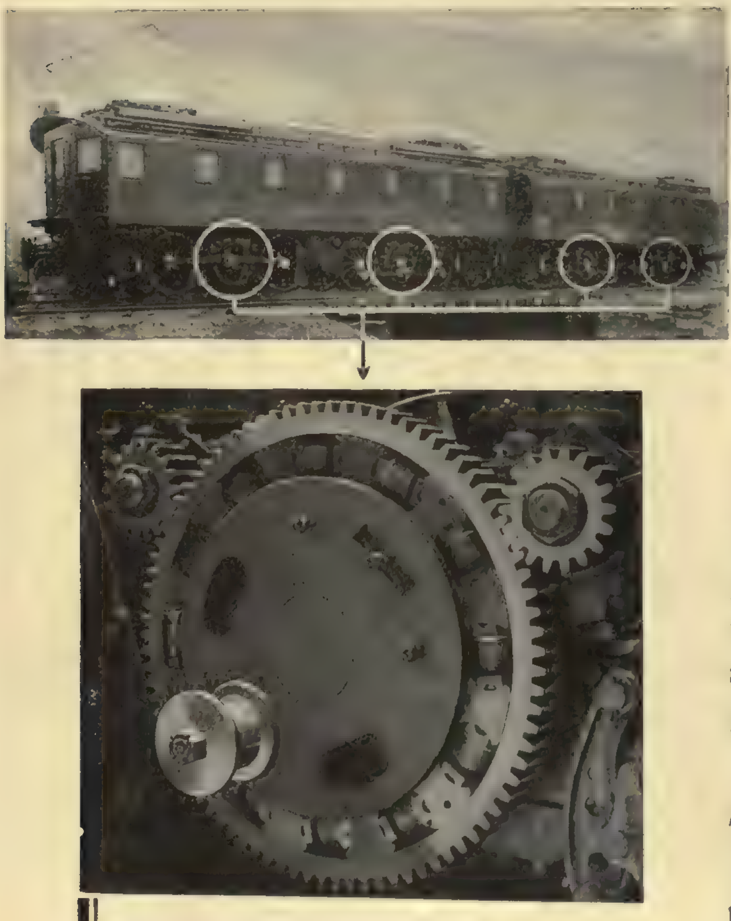
EL-15

**"CHICAGO PNEUMATIC"**

*Depend upon that name*

# NUTTALL

## Electric Railway Products



THE Electric Railway has a wide service.

EVERY step of the way from the light, Quick Service Car to the mighty freight and passenger locomotive makes slightly different demands upon the gearing that is used.

B.P. meets these demands as they should be met with long, well rendered service and has not yet failed to make good our guarantee covering it.

THE guarantee reads:—We will replace all B. P. heat treated gearing that does not last four times as long as standard untreated cast steel gearing in identical service, the adjustment to be based upon the percentage of actual to guaranteed life.

MEMBER OF AGMA

# Nuttall Gears

**EVERY GEAR REGISTERED**

# NUTTALL

# ELECTRIC RAILWAY PRODUCTS

## *The Pantagraph Trolley*

Up on top of your locomotives the substantial Nuttall built pantagraphs press their contact shoes firmly against the wire, collecting current steadily, dependably.

In every one of these Nutall-built pantagraphs from the copper contact shoes down, the seamless steel tubing, malleable iron parts, tempered springs and compressed air control device work together for the reliable, uninterrupted transmission of the power from the line to the motor.

When you see locomotives taking care of the severest service and with the highest degree of reliability you will find Nuttall-built pantagraphs on top.

**R. D. NUTTALL CO.**
**Pittsburgh, Pa.**

# Nuttall Gears

**EVERY GEAR REGISTERED**

## Auxiliary Controlled Circuits

The "Exide" Battery is used by a number of railways as a source of current at low voltage for operating auxiliaries, contactors, and for multiple unit and similar control circuits.

## Standby Service for Exciter Bus

It is standard practice to install a storage battery connected to the Exciter Bus to prevent interruption in the supply of current for field excitation. The "Exide" Battery is used for this service.

## Oil Switch Service

Storage batteries are used in power houses and sub-stations for the operation of oil switches and for supplying current for pilot lamps and emergency station lights in case of failure of power supply. For this service the "Chloride-Accumulator" and the "Exide" battery are used.

# "Exide"
# 'Chloride Accumulator"
# "Ironclad-Exide"
# Batteries

**For every service in Railway Electrification**

## Head and Tail Lights

The "Exide" Battery is being used in connection with head lights and tail lights for furnishing current in case of interruptions in power supply.

## Load Regulation

For carrying peaks and fluctuations of load, especially in connection with water power developments or where power is purchased on the basis of maximum demand, or for line voltage regulation, the "Chloride-Accumulator" is adapted.

## High-Voltage, Direct-Current, Locomotives

Direct current for operating compressor motors and auxiliary control apparatus during interruption of the normal power supply is important. The "Ironclad-Exide" Battery has been furnished for a number of large electric locomotives of this type.

## Storage Battery Locomotives

In Yards and on Sidings where overhead wires or third rail construction is objectionable, a storage battery locomotive equipped with the "Ironclad-Exide" Battery will meet the requirements.

## Regeneration on Mountain Grades

As a reservoir for storing the energy developed by regeneration while descending a long mountain grade, a storage battery of Chloride Accumulator "will fill the bill."

# THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of
The "Chloride Accumulator", The "Tudor Accumulator"
The "Exide", "Hycap-Exide", "Thin-Exide" and "Ironclad-Exide" Batteries

New York Boston Chicago Washington **PHILADELPHIA, PA.** Rochester Detroit St. Louis
Cleveland Atlanta Pittsburgh Minneapolis 1888-1919 Kansas City Denver San Francisco Toronto

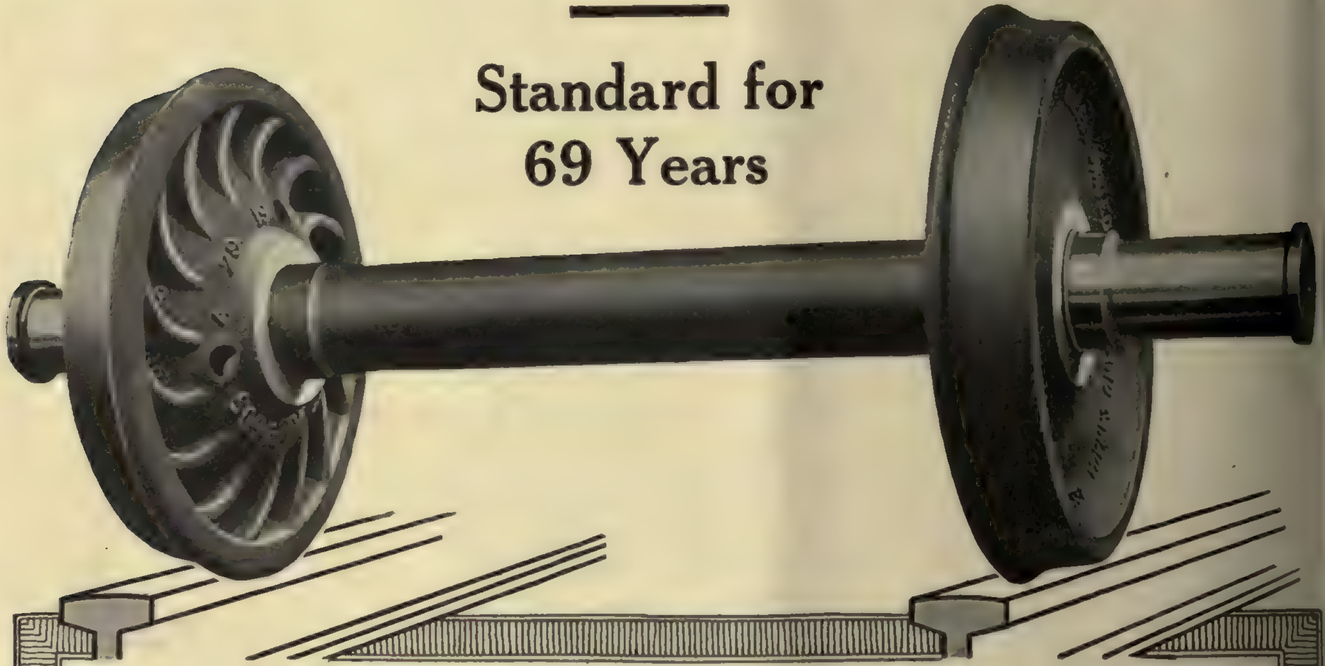
WHERE the wheel loads are heavy and the speeds high; where the wheel service is most severe; there you will find the Davis One-Wear Manganese Steel Wheel making records for high mileage capacity and low maintenance costs.

American Steel Foundries
1100 McCormick Bldg. CHICAGO

**DAVIS STEEL WHEELS**

# 25,000,000 Chilled Iron Wheels in Service

## Standard for 69 Years



## The Chilled Iron Wheel Has Performed Its Every Function at a Minimum Cost

### *For Freight Cars*

95 PER CENT. of all cars in this type of service are equipped with Chilled Iron Wheels, provided for by the MASTER CAR BUILDERS' STANDARDS, as follows:

| | |
|---|---|
| 625 lb. Wheel for Cars of 30 tons capacity. | 725 lb. Wheel for Cars of 50 tons capacity. |
| 700 lb. Wheel for Cars of 40 tons capacity. | 800 lb. Wheel for Cars of 70 tons capacity. |

### *For Street Cars*

The Chilled Iron Wheel is Standard for Street Car Service in 95 PER CENT. of all cities in the United States and Canada, operating 100 cars or over.

### *The Reason*

Chilled Iron Wheels possess a graded hardness of structure, which is ideal for service, namely: HARD TREAD, SOFT PLATES AND SOFT HUB; Chilled Iron will not CRUSH OR FLOW under heavy loads.

A demonstration of the BEARING POWER OF CHILLED IRON is found where heavy hoisting cranes are operated, each wheel carrying 105,000 pounds.

Chilled Iron Wheels under cars of 70 tons capacity are only required to carry 25,000 pounds each.

### *The Conclusion*

The uninterrupted use of Chilled Iron Wheels for 69 years under 95 PER CENT. of the nation's equipment proves that no other material can match them for economical and dependable service.

**ASSOCIATION OF MFRS. OF CHILLED CAR WHEELS**
**1229 McCormick Bldg., Chicago**

*Representing forty-eight wheel foundries throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels per day.*

# Yours for the asking

## Valuable to Every Electric Railway Official

Packed into the 280 pages of this book is valuable information regarding track construction and maintenance, so varied and complete as to make it an indispensable handbook. Useful data and tables, mostly original, with some taken from standard works, cover a wide range of track problems. Instructions are also given for ordering frogs, crossings, switches, turnouts, etc. There are over 200 designs, diagrams and illustrations. Size 5 x 7 inches, cloth bound. Sent free on request. Use the coupon.

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# IT IS THE EXPERIENCE THAT COUNTS

You have *faith* in a doctor, because through ***experience*** he has gained a ***reputation.*** In spite of years of study, and a brain packed with theory, without ***experience*** he could not acquire the ability to successfully practice his profession. Its the ***experience*** that counts.

WE HAVE HAD THIRTY YEARS OF EXPERIENCE in the manufacture of "UNION" Fuses.

The "UNION" RENEWABLE FUSE of today contains only the features that these thirty years of experience have proven to be good, together with the ***latest*** developments in fuse engineering.

The "UNION" RENEWABLE LINK blows without violence or viciousness, thus adding greatly to the life of the "UNION" fuse casing.

The "UNION" RENEWABLE FUSE will reduce your cost of fuse maintenance as compared with the use of any other renewable fuse on the market. This is a bold statement but we ***know from experience that it is a true one.***

You owe it to yourselves to give "UNION" RENEWABLE FUSES a trial.

**Chicago Fuse Mfg Co.**
*Renewable and Non Renewable Fuses*
**Chicago New York**

***Be sure that the trade mark "UNION" is on every fuse you buy. Sold by electrical supply dealers everywhere.***

# American Troops Entered Los Angeles In 1846

Contrast in your mind the condition of the little hamlet at that time as shown in the above illustration, with the great busy city of today.

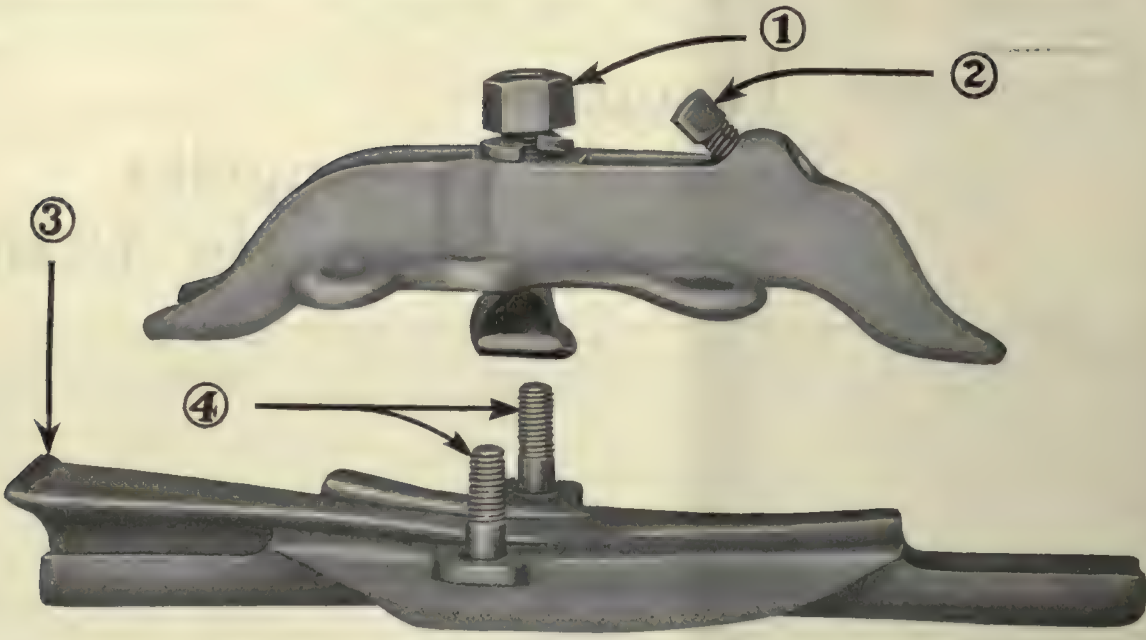
And then consider that the foundation of the transformation from a quiet little village sleeping in the California sunshine to an energetic center of hustling commerce has been cemented by the advantages that spring from adequate, modern transportation methods.

The great transcontinental railway lines that link Los Angles with every section of the country, the efficient street railway cars that carry its citizens rapidly to and fro in their daily pursuits, the converging interurban lines with their sixty-mile-an-hour cars that tap the country for miles around bringing produce and trade, are nearly all served by

## Galena Oils and Galena Service

Adequate rapid transit service has been a big factor in the upbuilding of Los Angeles, and Galena Service has been a big factor in the progress of transportation methods.

**Galena-Signal Oil Co.**
**Franklin, Pa.**



# Why the Form N Trolley Frog Leads in Popularity

The great advantage of G-E form N frogs over other types is the renewable pan feature. Less than two minutes' work will remove a worn out pan and install a new one, thus minimizing delays besides saving labor. One body will outlast many pans, saving expense and storage room.

**Note these four points:**
(see illustration)

1. This single hexagonal nut draws up the T bolt which clamps the trolley wires firmly.
2. This set screw holds the dead ended wire securely in place.
3. This guard on the pan prevents wild trolley poles from catching on the frog.
4. These two bolts attach the pan to the body—this method of attaching makes possible the present record of a new pan in 40 seconds.

**Knowing all this, can you seriously consider any other type of frog for your road?**

G-E LINE MATERIAL
**can be delivered promptly from stock**

**General Electric Company**
General Office Schenectady, N.Y.

40-70

# Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

*Volume* 53 New York, Saturday, June 14, 1919 *Number* 24

### These Are the Three Ways Out

IN THE admirable informal remarks made by E. A. Maher, Jr., the incoming president, at the Lake George meeting of the New York Electric Railway Association last Saturday, the speaker made the point that the railways are confronted with the two-fold and urgent necessity, on the one hand, of introducing every possible operating economy and, on the other, of securing more income. He did not have time to elaborate his thought, but in the minds of his hearers undoubtedly the second of these alternatives automatically subdivided itself into two parts, namely, securing a higher fare per average passenger and increasing the number of passengers, particularly those of the most profitable varieties. There may then be said to be three ways out of the present difficulty, and while every effort is being made to increase (in a positive direction) the margin between income and outgo per passenger, the expanding of the business needs attention also. And not only are more passengers to be secured but as many of them as possible are to be persuaded to ride at other times than during the rush hours. The fact is that if the business can be properly expanded it will be considerably easier to maintain the much-desired margin already referred to.

### Electricity As a Rival of Steam on Railroads

LESS than usual has been heard lately regarding electrification of steam railroads because war work has absorbed attention. Electrification is too much of a long-time process to have been favorably affected during those months of quick results. Now that times of comparative peace have arrived, and attention is being directed as never before in the line of conservation, this topic is bound to come in for renewed consideration.

Electrification offers a wonderful opportunity for saving in capital expenditure, particularly in those cases where expanding business demands new facilities which by other means would be inordinately expensive to provide. This was the prime consideration with the Norfolk & Western Railway and the Pennsylvania Railroad (Philadelphia terminal), and an important one in other instances. In the case first mentioned the higher, sustained speeds of electrically-hauled trains on heavy grades offered an irresistible opportunity to expedite traffic. In the second case cited the situation was different, the flexibility of make-up and movement of multiple-unit suburban trains being the deciding factor. To some advocates of judicious electrification the conservation of capital appears to be the predominating element.

Possibily the matter of anticipated fuel economy has been urged more forcibly than other arguments by the proponents of electricity as a source of railroad motive power. The fact that it offers the only possible connecting link between the waterfall and the locomotive gives it an unique position, analogous to that of alternating current in the general power distribution field. It is possibly more difficult to "prove out" the economy of electric operation on this basis, but it is certainly sound over-all conservation to use to the limit a form of motive power that cuts down materially the rate at which the supplies of coal and fuel oil are being depleted. The general public ought if necessary to be willing to help in financing a proposition that will accomplish this result.

Nothing has been said here as to the electrification of tunnels and city terminals, where considerations other than capital or operating economies have ruled. Here the expenditure must be justified on grounds of necessity, and there is nothing left for argument once the controlling premises have been laid down.

### Electric Locomotives Must Be Handled as Such

AMONG the articles in this issue which bear on the subject of heavy electric traction, one that contains a direct message to the men responsible anywhere for the operation and maintenance of electric locomotives is that by A. H. Babcock, consulting engineer Southern Pacific Railroad. The message should be taken to heart by the interurban railway man who has freight locomotives under his care, as well as by his brother in the steam railroad field. The message is that in view of the characteristics of electric motors they cannot be handled in the same nonchalant fashion as is possible with steam engines. The very property which lies behind the virtues of the electric locomotive renders it subject to possibility of abuse, inadvertent possibly, but nevertheless injurious.

When the steam pressure from a locomotive boiler is given free access to the engine piston it can produce a definite force and no more. And this force can do no harm to the machine as a whole. If the load is too heavy the engine "stalls," that's all. But there is nothing to limit the current that can be drawn by an electric locomotive except the power plant and line capacity, the setting of the circuit breakers or the breakdown point of the motor insulation. Years ago W. S. Murray pointed out the proneness of engine operators, transferred from steam to electric locomotives, to overload the latter. If this is done the result is excessive maintenance cost and all-around and undeserved condemnation. At the same time it is not desirable to give the protective devices too low a setting because it may be necessary at any time to impose upon the motors for a short time overload. The operator must not permit the "willing horse" to pull too hard.

### Taking Out a New Lease On Industrial Life

THERE seem to be three classes of people in the electrical railway business at present, as disclosed by the strenuous period through which it is now going. One sees a big future of usefulness and reasonable profitableness ahead, after some difficult but soluble problems have been mastered. Another wishes to salvage the present investment and get into some line of activity where good work is better appreciated. The third doesn't care a rap what happens. The industry and the public are to be congratulated that the first class is large and that there are hosts of able men who will fight to the last ditch to safeguard the business. The men in the second class will stand by if they see a reasonable chance of victory. Good riddance to the others if they quit! What is needed now is a freshening of hope and faith in the integrity and stability of the business, with a renewal of the vigor and vim of the early nineties.

### Standardization Must Take a Logical Course

RAILWAY officials who are buying equipment to-day consider that the motor of two years ago is quite obsolete and insist on having the latest design for their new equipment. Probably these motors of to-day will be superseded in their turn by others as the art advances, although it is reasonable to expect that changes will be less frequent and radical as time lapses. The railway motor has been mentioned simply as an example and is but one of the various parts which comprise the car equipment. In developing a satisfactory design the manufacturer produces the best that he can at the time that it is manufactured. This equipment is placed in service, and perhaps some of the detail parts do not work out in an entirely satisfactory manner. In the next design the engineer will try to overcome these troubles and objections, and although the changes at first may be considered as very insignificant, they often lead to far-reaching changes in design.

As an example let us consider the changes which have been made in the contour of the teeth in the gears of some of our late-type railway motors. A few years ago manufacturers would have been willing to say that they could standardize on a tooth of a particular shape. One of our foremost motor designers stated that by the change in the shape of the teeth used he had been able to eliminate one tooth from the pinion of a railway motor. But in doing this he changed the gear ratio and required a corresponding change in the speed characteristics of the motor. This speed adjustment actually produced a far-reaching economy which would never have been expected as a result of a small change in the shape of the teeth in the gears.

If a standard is adopted for any detail of the equipment the manufacturer will endeavor to build the other parts of the construction around this standard. In doing so, is it not possible that some standard may be adhered to when a small change might produce results beyond those intended and lead to unexpected progress? The interest of the manufacturer and the purchaser is a mutual one in regard to using standard parts. The manufacturer desires to minimize the number of special dies and tools required, and by using parts of the same dimensions, or parts exactly alike, in the various types of construction, great economy in their manufacture results. Operating officials are equally interested in keeping down the number of repair parts which it is necessary to carry in stock to maintain their equipment. The stocks of these soon reach enormous proportions and in comparing some parts which vary only in a few slight dimensions the official sometimes concludes that proper foresight has not been used in their design, or that proper co-operation among the manufacturers has been lacking. On a large scale operating engineers will admit that it is not practical to expect standardization. A universal motor that can be built by all manufacturers would soon be obsolete. Automobile manufacturers bring out a new model every year. A universal motor that changes every year would be of no benefit as far as reducing the number of spare parts necessary to maintain it is concerned. Each new customer brings new ideas in construction and new problems in operation and maintenance to be overcome. Equipment designs advance by using the best of these ideas and by solving the problems for the industry. Interchangeable armatures, field coils, brush-holders and bearings in a modern railway motor would discourage advancement, but no doubt many small parts which have been used for years and continue to be used, could be standardized so as to help improve conditions. We hope something can be done along this line.

### The Low-Cost Producer Merits His Reward

THE grant of a 2-cent transfer charge to the car lines in Washington, D. C., while apparently made merely as an expedient to give the particular amount of additional revenue deemed to be necessary, will in all probability bring results of great interest to electric railways in general.

That the cost of transporting a passenger for two-line riding is greater than that for single-line riding has been widely recognized, and it has been admitted that the imposition of a transfer charge is theoretically justifiable. But in particular cases questions of practicability have often been raised. Transfer riding is to a large degree convenience riding; will it not therefore be seriously reduced by an added charge? The transfer passenger who is required to pay extra for a ride of a few blocks around the corner is not likely to view with equanimity a long free ride for others on the main line past the transfer point; will there not therefore be an incessant clamor for through routing?

These troublesome matters, together with the fact that the financial needs of electric railways have generally been such as to demand greater aid than that obtainable even theoretically from a transfer charge, have caused the trials of this device to be very limited. Consequently the results, upon traffic, routings and revenues, of the addition of a 2-cent transfer charge in Washington to a flat 5-cent fare, are likely to be instructive, even if the suitability of a transfer charge as the main means of revenue assistance in most cases must be doubted.

The novelty of the Washington decision, however, lies not so much in the transfer charge itself as in the grant of such aid both to the needy Washington Railway & Electric Company and to the inferentially nonneedy Capital Traction Company and Washington-Virginia Railway. The commission finds justification for this unusual proceeding in the fact that owing to competition a transfer charge for merely the Washington Railway & Electric Company would result in a diversion to the other companies of sufficient traffic to offset the gain in revenue from the transfer charge.

Regardless of this matter of traffic, the award of the transfer charge to the more prosperous companies has economic justification. The cost of production—the price determinant—is in the case of the Washington Railway & Electric Company not that of the least efficient high-cost *entrepreneur* but that of a representative average-cost producer. It is economically just that this average cost should fix the normal price of the railway ride in Washington. To be sure, the other companies—the low-cost producers—will reap the gain of ability and fortune, but until such time as the public does everything in its power to effect a unification of all lines upon a consolidated cost basis the low-cost lines are fully entitled to their reward.

## Where Hope for the Railways Lies

WE BELIEVE that the most encouraging event of the last few years in electric railway affairs has been the appointment of two impartial commissions to investigate the existing electric railway problem, the one to represent the United States Chamber of Commerce and the other the United States Government. It has not been difficult for those who are actually engaged in electric railway operation to have foreseen for a long time that a crisis was coming in the affairs of these properties. For many years the margin has been growing smaller between income and outgo, but although electric railway operators realized this fact, they had difficulty in making anyone else understand it. The depreciation of the dollar during the past two or three years has of course accentuated these conditions tremendously, so that not only has all new construction now stopped but the whole industry has been projected into the condition with which our readers are unfortunately too familiar.

A solution of the matter is now to be sought by interests which are outside of the railway industry proper but, at the same time, are vitally interested in the maintenance of railway credit and service. The two commissions are admirably fitted for their tasks, the Chamber of Commerce body being able to enlist the interest in the investigation of chambers of commerce throughout the country while the federal body represents federal, state and municipal governments, the investors, the operators, and labor. On these two commissions will devolve the task not only of investigating the condition but suggesting a remedy. It would be useless now to speculate on what the best solution is to be. That is the question to be decided by the two committees. We may express the hope, however, that the study will be carried forward with dispatch. The high standing of the members and the sacrifice which all are making to participate in this hearing indicates an appreciation by them of the seriousness of the situation.

Electric railway companies will be derelict to their trust if they do not assist the two commissions in every way which is open to them. Presumably, some data will be required after both investigations get well under way, and possibly some personal testimony on the condition of the industry. Both of these the industry and all connected with it should cheerfully furnish. This, at least, is one way in which the railways can assist and it is essential.

## Help the Schedule Maker to Save Car-Hours and Car-Miles

"MOTIONLESS cars cannot increase a company's income." In this statement may be summarized several of the strong points made in a recent address before the Public Service Railway company section by Alexander Jackson, which was abstracted in our issue of May 31. Another fundamental truth is "the timetables of an electric railway property are the cornerstone upon which the financial structure is built."

Some years ago, before the unions were insisting on easier working conditions, the minimum day's pay was hardly known and schedules were arranged so that tripper cars could be placed where needed without adding seriously to platform expenses. This, of course, was an advantage to the riding public. Later, as the unions had their way, many companies were compelled to pay for six, seven or eight hours' work whenever a trainman was assigned to a run, and the result was a penalty on tripper service. Moreover, contracts with unions on certain properties called for payment of bonus time at the beginning of a day's work, at the end of a day's work, for dinner reliefs, etc. All of which meant other additions to car-hours which had to be paid for by the companies.

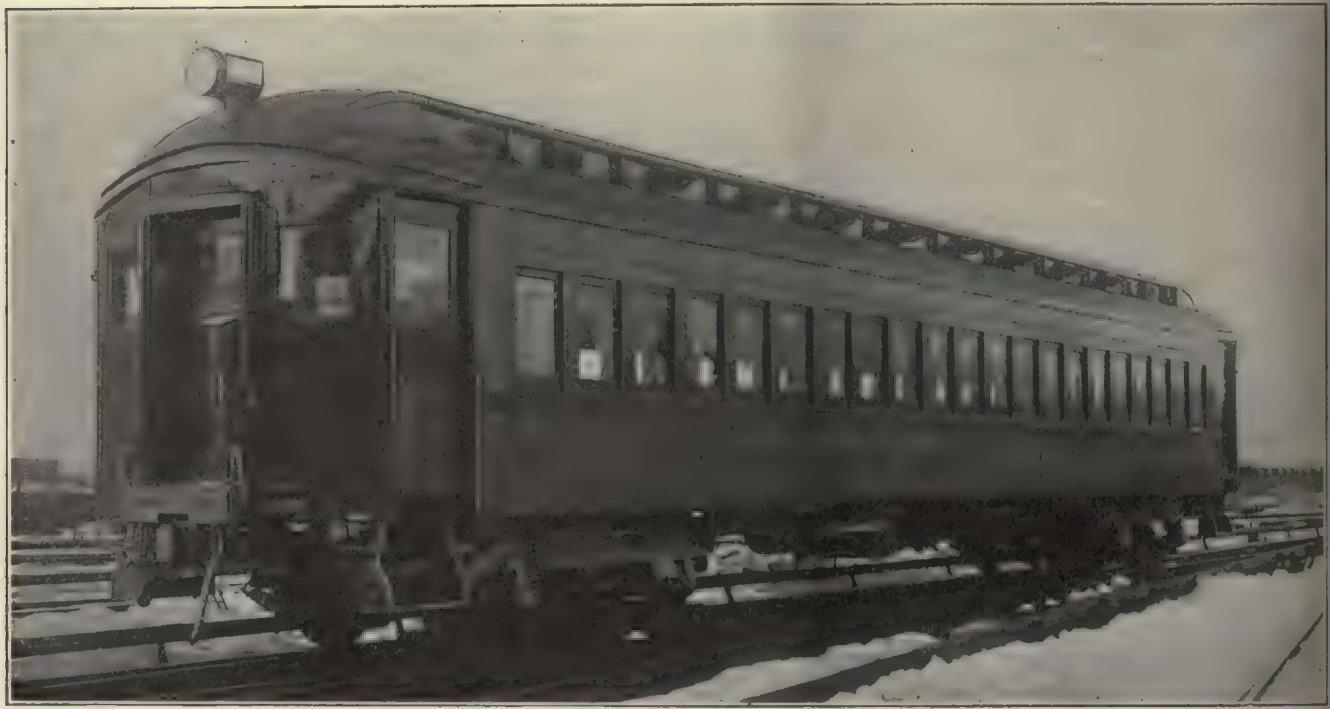
Mr. Jackson shows that $150,000 would be added annually to platform wages on the Public Service property if only two minutes were allowed as additional layover time on the 14,274 trips operated daily by that company. A person who is not familiar with schedule making or with operating details would be likely to overlook the serious effect of such a change in schedules. Hence the necessity for giving serious heed to the advice which Mr. Jackson offers to division superintendents and other officials upon whose recommendations timetable changes usually are made.

In city service where delays are frequent it would be impracticable, of course, to build schedules on the exact uninterrupted running time between terminals. There must be allowance in the schedule for "slack" to permit the cars to leave on time even if an ordinary blockade takes place. The amount of this "slack," however, can only be determined by an efficient schedule maker, and if the best results are to be secured the men who are intrusted with such work must have the support of the management against the protests of road officers who may be incapable of weighing the company's interests against the demands of some dissatisfied trainmen.

Every competent operator knows that it is just as easy to give too much service as too little, and he is aware also of the dangers in either extreme. Schedules, of course, should be based on preliminary surveys of traffic requirements. They should be supported by adequate supervision of service with a view to preventing bunching of cars. Frequently it will be found that there are enough cars on the various lines if they are properly distributed. Division superintendents and supervisors can perform a very useful duty in reporting inadequacy of service or too liberal layover time at terminals, and the operating executive should never let them lose sight of the fact that each car must earn its proportion of revenue and that it cannot do this unless it holds its place on a well-considered schedule. A car on the street (when traffic awaits it) is worth a dozen in the depot or at lay-over points. "A rolling stone gathers no moss" was not written of the electric car.

# New York Central's Latest Motor Cars

**For Suburban Service on Its Electrified Zone the New York Central Railroad Has Just Placed in Operation a Number of 59-Ft. Multiple-Unit Passenger Cars That Differ From the Company's Previous Equipments in Many Respects, Both in Structural Details and Electrical Equipment**



COMPLETELY EQUIPPED CAR READY FOR SERVICE

AS A REPRESENTATION of fifteen years' experience with a uniformly successful steam railroad electrification, the New York Central's latest motor cars, just placed in service, attain no ordinary degree of importance. The design, which has been worked out by the engineers of the New York Central Railroad, follows steam railroad standards in so far as the electrical equipment will permit. This is to be expected in view of the fact that the cars are operated on one of the most important of American suburban electrifications, the construction having been based upon the possibility of operation with standard steel passenger coaches as trailers as well as that of operation in trains behind steam locomotives in case of movements beyond the limits of the electric zone. To that end the cross-section dimensions and the external appearance practically coincide with the road's rolling equipment for trunk-line service.

For the new car's trucks, however, there exist the material differences necessitated by the introduction of the electric equipment, and the four-wheeled design, instead of six-wheeled arrangement that is used for the locomotive-drawn coaches has involved particularly heavy construction to conform with the general plan, axles of 8$\frac{5}{16}$ in. diameter being used on the motor truck together with 6½ in. x 11 in. journals. In addition, the need for provision for making up trains on the curved yard tracks, due to the space restrictions at the New York terminal, has required a radial draft gear whereby the coupler shank is moved by spring connections to the truck end frame in accordance with the radial movements of the truck on the curved track. A coupler with an extended guard arm has also been provided. The minimum radius of curve around which the cars are required to operate normally is 135 ft., equivalent to a 42-deg. curve.

In the suburban service for which the cars were designed, a maximum speed limit of 55 m.p.h. has been established. This moderate figure, however, gives rather a wrong impression of the severity of the service, which calls for twenty-three stops in 34 miles on the line along the Hudson River to Croton, and for nineteen stops in 22 miles on the line to White Plains, the schedule speeds for local trains on these runs approximating respectively 27 m.p.h. and 24 m.p.h. For local express trains on these two lines the schedule calls for 29 m.p.h. and 30 m.p.h., with 10 and 9 stops respectively. As the weight of the complete car approximates 65 tons empty, or, say, 71 tons with a full passenger load, the work required of the two 190 hp. motors with which each car is equipped may be seen to be by no means light.

### STRUCTURAL DETAILS

As may be expected from the foregoing outline of the service, involving the possibility of mixed steam and electric operation, the new cars are notable for their ruggedness of construction. The bodies are built up on the truss-side principle, with the stresses due to the span of 44 ft., 10 in. between center plates carried by

INTERIOR VIEW OF FINISHED CAR, SALOON END

the entire side of the car. The side posts are relatively wide in comparison with the height of windows and their spacing, and rigidity sufficient for the posts to do their share in transmitting longitudinal shearing stresses between the roof and floor of the car is provided for by a wide letterboard and channel at the eaves and a $\frac{1}{8}$-in. sheathing below the windows. Buffing and pulling stresses are largely taken up through an underframe which includes two 8-in., 21.5-lb. channel center sills as well as the side sills which are 4-in. x $3\frac{1}{2}$-in. angles reinforced with Z-bars pproximately 9-in. height, 6 in. total flange width and -in. thickness.

At the bolsters the side and center sills are tied together by a huge steel casting that combines the functions of the body bolster, end sills, and platform sills and also of that part of the center sills ordinarily extending out beyond the body bolster. Support for this casting is provided by framing into it the center sills and he bottom members of the truss that is made up from he construction of the car side; and so long as this heavy casting remains straight it is, therefore, impossible for the platform to sag. At the same time buffing trength is provided by the rigid tying together of all ongitudinal members at the bolster.

The floor, which is supported on the usual system of ross-bearers and stringers, is made up of composition esting on $\frac{5}{8}$-in. galvanized steel flooring of No. 22 gage. The total thickness is $1\frac{1}{8}$ in. Over the platforms there xtends a $\frac{3}{8}$-in. floor plate, and this is surfaced with an nti-slip tread. The false flooring to deaden noise and upport the hair-felt heat insulation is located $3\frac{5}{8}$ in. elow the main floor between body bolsters and at the car ends, and outward from the body bolsters similar provision is made by riveting $\frac{1}{16}$-in. sheet steel to the under side of the bolster and platform casting. The superstructure, as previously mentioned, begins with a $\frac{1}{8}$-in. side sheathing attached to side posts that are made up from $\frac{5}{32}$-in. channel - shape pressings $4\frac{3}{16}$ in. wide and $2\frac{1}{8}$ in. deep, two of these pressings being set up face to face $7\frac{1}{2}$ in. apart and joined with $\frac{1}{8}$-in. plate to form each post. At the top of the posts is a 4-in., 5.25-lb. channel which serves as the side plate, and to this is riveted a $\frac{3}{32}$-in. letterboard $11\frac{3}{4}$ in. wide. The belt rail is located outside of the side sheathing and is $4\frac{1}{2}$ in. wide by $\frac{5}{8}$ in. thick. Inside the wall, 10 in. from the top of the finished floor, is a $\frac{3}{16}$-in. thick truss angle that extends out $3\frac{1}{2}$ in. to support the wall ends of seats and the heaters, and below this is riveted the heater box of light steel pressed into channel shape.

At the ends of the car the bulkheads are built up on 6-in., 15.7-lb., Z-bar corner posts, and 6-in., $12\frac{1}{4}$ lb. I-beam end-door posts, with intermediate posts made of $\frac{3}{16}$-in. pressings $7\frac{3}{16}$ in. deep. Along the vestibule eaves is a body end plate of 6-in., 8-lb. channel framed into the side plate with a pressed gusset, and it is reinforced with a horizontal $\frac{1}{4}$-in. plate 12 in. wide extending for the full length of the end-plate channel.

To take the impact of an over-riding platform in case of collision are vestibule end posts of 6-in., $12\frac{1}{4}$-lb. I-beams behind $\frac{3}{16}$-in. pressings, as well as vestibule corner posts that are built up with $\frac{1}{8}$-in. plate pressed into the form of a flattened ellipse, these serving on one side for the vestibule door jambs.

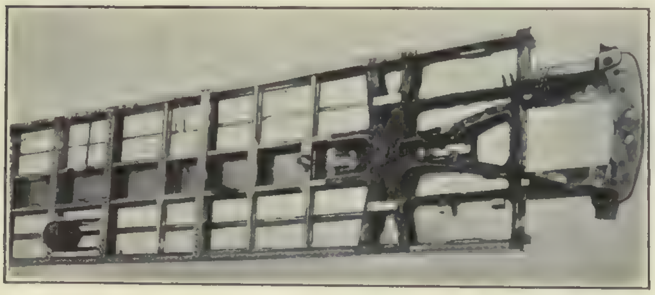
A monitor roof has been provided in accordance with

CONSTRUCTION VIEWS TAKEN DURING APPLICATION OF HEAT INSULATION AND AFTER THAT OF WAINSCOTING AND STEEL MOLDINGS the plan of making the new cars similar in appearance to the road's standard passenger coaches. Its supports are the customary pressed steel carlines spaced 2 ft. 8 in. center to center for the upper deck. The roof sheathing for the upper deck is No. 14 gage steel with joints welded, and for the lower deck, generally, of $\frac{1}{16}$-in. steel. Copper gutters of No. 18 gage metal are provided over doors and motorman's windows, these being riveted and soldered to the roof sheets.

For the protection of the car interior against temperature differences existing outside there has been used insulation consisting of layers of hair felt stitched with layers of sheet asbestos between them. This insulation has been introduced both above the false flooring and behind the finishing material at the sides of the car, being cut to form, and set in place as shown in one of the accompanying construction views.

### CAR BODY

In its general arrangement the car body follows standard practice, except, perhaps, in regard to size. This appears in the comparatively high seating capacity of eighty-two, which figure has been attained with an over-all length of 69 ft., 5 in. by the adoption of a 32-in. seat spacing, the seats being designed with relatively thin backs upholstered in rattan. The side post spacing agrees with the seat spacing. The car length of the car body is 59 ft. Because of the ample clearance prevailing on the trunk line of which the electrified zone is part, a width over side sheathing at the sills of 9 ft., 9 in. is permitted, and this in turn permits a seat width of 3 ft., 5½ in. and a 24-in. center aisle.



UNDERSIDE VIEW OF ONE-HALF OF UNDERFRAME

Freedom from combustible material has been emphasized in the interior construction. In fact, only window sills, sash, arm rests on seats, and toilet hopper seats and covers have been made of wood. In general, Cuban mahogany has been used for these details, and the scheme of interior decoration has been made to match the color in the lower portion of the car, while the headlinings are painted in pearl gray enamel.

For the interior finish steel and waterproof material have been used throughout, including integral window frames which extend from the window stooling to the plate molding. Wainscoating between window stooling and seat-rest angle is of ⅜-in. material in 9-ft. lengths, joints being made with steel battens. The headlining is $\frac{3}{16}$ in. and ¼ in. thick and is fastened with steel ceiling battens and screws. All partitions are double and are fastened to the car framing with standard channel fasteners.

All doors, except that for switchboard cabinet, are of built-up steel construction, ranging from, $\frac{15}{16}$ in. to 1¼ in. thick, with pressings that conform to the general finish of the car. At the vestibule ends the doors are designed to swing open and cover the control equipment in accordance with the very general practice. Al doors, it may be said, are mounted to swing, not t slide. They close against pieces of solid rubber bound with metal, as well as ⅜-in. zinc and gray rubber weather strips at the top and sides of the door openings. Reinforcements of the doors for the application of door locks and hinges are welded to the door frames. Spring balanced trapdoors are provided for use at the Grand Central Terminal in New York, where the station platforms are at the level of the car platform. The upper sides of the trapdoors are covered with $\frac{3}{16}$-in. inlaid rubber tiling laid on cement.

All windows are single and in one part. Cuban mahogany sash, 1 in. thick, have been used, and these are made tight with weather stripping all round the outside as well as on the inside at the top. Window sills and drop aprons are also of Cuban mahogany set in paraffin. American polished plate glass ¼ in. thick is used for all sash except for the saloon window, which has pressed prism plate glass.

An ingenious arrangement for the electric heaters provides for their location in a lined box along each side of the car between the floor and the previously-mentioned truss angle. As the heaters have been spaced with regard to the seat spacing, any defective unit may be easily removed without disturbing its seat, while the wide and substantial strip of metal above the heaters protects them from damage by passengers' feet. A perforated front plate provides for the escape of heated air.

Ventilation is provided for by twenty-one exhaust-type ventilators at the clerestory and a fresh air intake at each end of the car. A separate ventilator is used for the saloon.

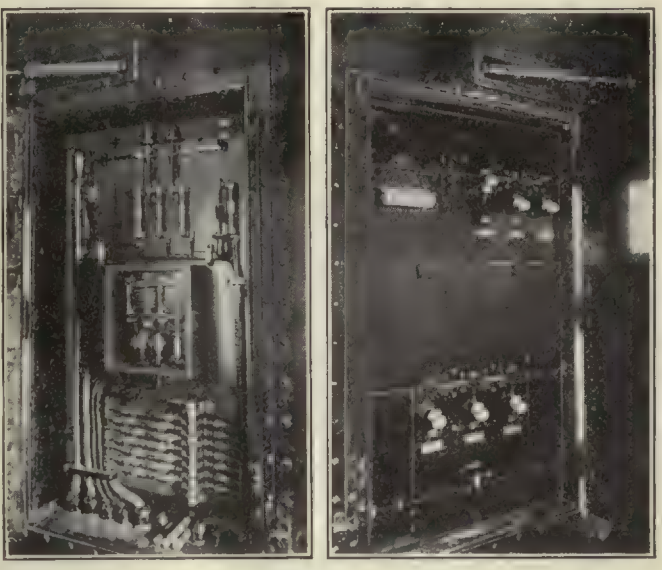
The system of artificial lighting follows the principle of direct illumination that has become practically standard on electric cars in recent years. The location of the lamps is at the bottom of each side of the clerestory, and the translucent shades have a base that flares outward at quite a wide angle. Along the center line of the ceiling are the usual emergency lights with clear globes.

The carbody complete, with all equipment and ready to mount on the trucks, weighs 83,700 lb.; the trucks weigh 45,300 lb., of which 29,400 constitutes the weight of the motor truck with its motors, and the total weight of the complete car ready for operation is 129,000 lb.

### MOTORS AND CONTROL

Owing to the fact that the new cars are considerably larger than those originally placed in service on the New York Central electrified zone, the propulsion equipment is proportionately more powerful than that with which the original suburban equipment was provided. In consequence the new motors were specified to perform any service, on cars weighing 75 tons loaded, that is now being performed by the motors on the original 58-ton cars, and it has been required also that they shall operate satisfactorily on trains made up indiscriminately of the old and new types of cars.

The motor is provided with tapped field, commutating poles and self-ventilation. It operates normally at 600 volts direct current but is capable of successful operation at voltage up to 750. Space restrictions have had a marked influence on the design, owing to the use of clasp brakes and the desire to utilize standard electrical construction, and to this end the gear face has been reduced to 4½ in. in place of the 5-in. face that would ordinarily have been used. Above the rail 4½-in. clearance has been provided, the wheels being 36 in. diameter. The details of construction follow standard practice generally, including provision for brush holders that will give 1 in. brush wear on a commutator 2 in. smaller than the original diameter and an arrangement of brushes that will prevent wearing of ridges on the commutator. A density of 60 amp. per square inch of brush section has been set, this being based on the average accelerating current. The gears are solid and of rolled steel, and the pinions are forged. The gear ratio is 2.83 with 18 pinion teeth and 51 gear teeth.



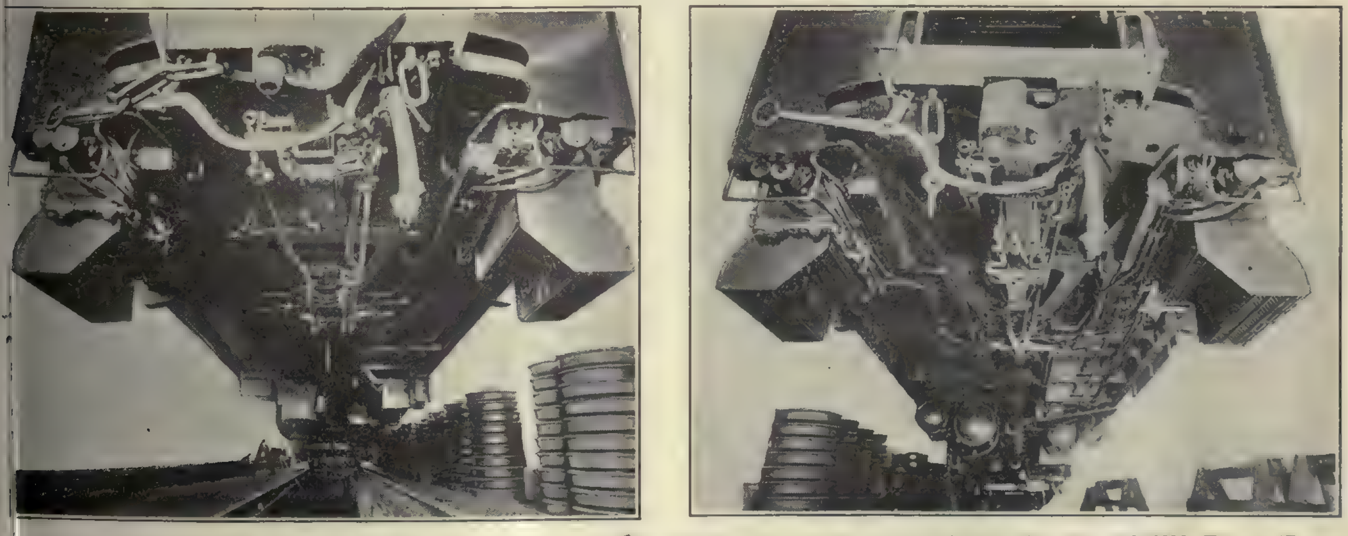
MOTORMAN'S AND TRAINMEN'S SWITCHBOARDS, THE FORMER PROVIDED WITH INTERLOCKED DOORS IN FRONT OF SWITCHES

Spring support for the motor nose has been adopted, the design providing for four compression springs to take the load due to the downward pressure from the motor weight and two compression springs (underneath the lug on which the former four springs rest) having long bolts that extend up through the yoke that holds the motor nose down. The safety lugs are novel in that they carry clips for the motor leads and are provided with holes to allow them to replace the customary bail, which has been eliminated because of interference with the leads. Another feature is the axle bearing lining, the metal being chamfered off to clear altogether the fillet at the collar while a large bearing surface against the collar in a vertical plane is provided to take the horizontal pressures set up under operating conditions.

When tested on the stand the actual one-hour rating of the motor is 190 hp. For acceleration a current averaging 250 amp. has been adopted. Under these conditions the motor gives a tractive effort of about 3500 lb. which in turn provides an acceleration of about 1 m.p.h.p.s. Electro-pneumatic control has been installed. These equipments, like other features of the new cars, have been so designed that they will operate in conjunction with the control system furnished on the original cars. An effort has been made to have a considerable number of the parts entering into the new design interchange with those of the old. In general principle the new control follows the arrangement of having all power circuits made and broken at a pneumatically rotated drum which is mounted beneath the car floor and which is governed in its movements by a master controller in the cab. No reversing handle is provided for the latter, movement of the train in the opposite direction being effected by movement of the main controller handle in the opposite direction from the off position. Under this arrangement only series connections are provided for the reverse, since backward movements are invariably made at low speed.

Acceleration may be accomplished either automatically or by hand, the former being under control of the current-limit relay on each car, and there are ten notches for forward running and six for reverse, these including, of course, the running positions made available by the field control as well as the customary intermediate running points.

Train wires are seven in number exclusive of the bus line, and two of these wires must be energized to close the motor circuit. For full operation with the earlier cars one train wire is arranged to connect with the circuit-breaker trip wire, and energizing this provides for shutting off current from the motors. Further safety provisions include the customary return of the



UNDERSIDE VIEWS OF TRAILER AND MOTOR TRUCK ENDS, SHOWING ARRANGEMENTS OF PNEUMATIC AND ELECTRIC AUXILIARIES GROUPED RESPECTIVELY AT THE TWO ENDS TO SIMPLIFY CONNECTIONS controller handle to off position when released by motorman, as well as interlocks to insure proper sequence of closing contactors.

### TRUCKS

Both motors for each car are mounted on one of the trucks the other, or trailer, truck being designed with journal centers of 77 in. instead of 80 in., a maximum axle diameter of $7\frac{3}{8}$ in. instead of $8\frac{5}{16}$ in., and $5\frac{1}{2}$ in. x 10-in. journals instead of the special size of $6\frac{1}{4}$ in. x 11 in. required by the unusual weight on the motor truck. The wheel base of both trucks, however, is 8 ft., and both are fitted with clasp brakes. The theoretical center plate load for which each truck was designed was 61,000 lb.

Steel pressings have been used for the side frames and end frames and connections are generally made by riveting, but where bolts are used they are tapered $\frac{1}{16}$-in. in 12 in. in all cases. The transoms and bolster are steel castings, and renewable wearing plates have been provided for them as well as for the pedestal jaws. It may be mentioned also that all holes in castings for pins have been bushed to provide for easy repair following wear.

Braking pressures for the clasp brakes are designed to reach 100 per cent of the weight carried on the rail by the motor truck wheels and 90 per cent of that of the trailer truck wheels in a service application, when the car is without passengers. The shoes are steel-back type and the heads malleable iron.

The third-rail shoe beams are bracketed to the equalizer bars on either side of each truck and to each beam is attached the third-rail shoe rigging. A feature of the New York Central standard for this construction is the installation of a spring pressure device which takes the form of a hinge working against a spring in the bracket that is attached to the shoe beam. This hinge permits sufficient motion at the shoe (which extends a considerable distance outboard from the hinge joint) so that the shoe can follow inequalities in the third-rail. The shoe however is in the form of a casting that has notched arms between it and the point of attachment to the hinge casting, so that it is easily broken off in case it strikes an obstacle and thus does no damage to the hinge. Adjustment vertically to provide for the effect of wear at the wheels and journals is effected by corrugating the surface of the hinge and also that of the shoe casting that bolts to it.

The truck wheels, which as mentioned previously are of 36-in. diameter, are of the single-plate, solid-steel type and are of standard passenger coach design for the trailer truck, while for the motor truck they are provided with special hubs for the gear cases and to take the end thrust from the motor.

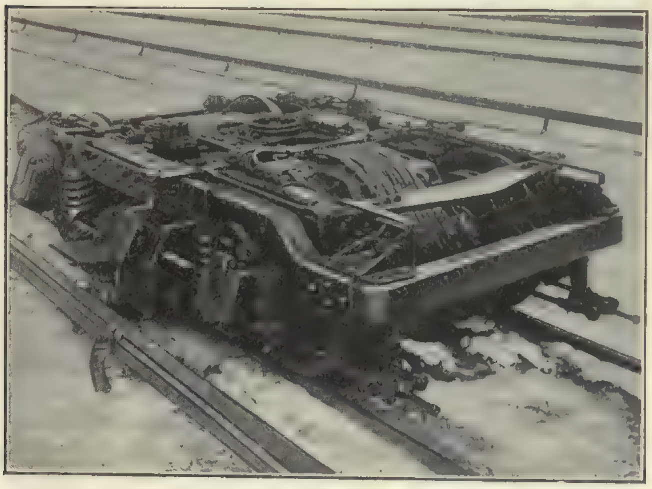
M. C. B. type journals with collars have been adopted, but the journal brasses have downward extensions to hold the journal firmly in place at all times, even though clasp brakes have been provided, this design being substantially in accordance with the principles of the semicircular journal brass pointed out several years ago as essential to high-speed electric railway car design. Journal boxes are of substantial standard design.

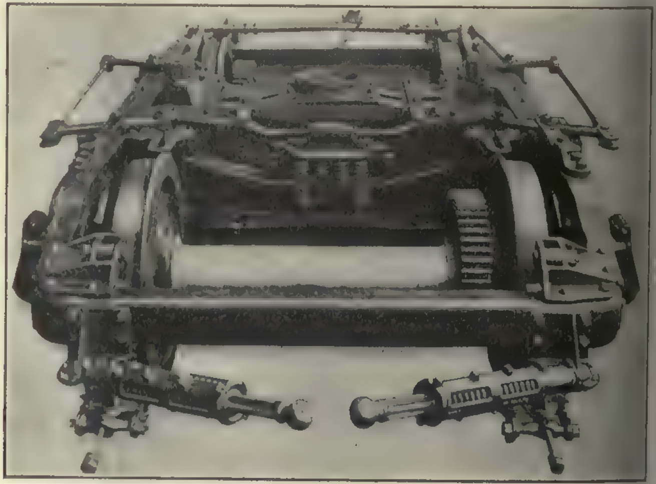
### MISCELLANEOUS EQUIPMENT

As the cars may sometimes be hauled, outside the electrified zone, behind steam locomotives equipped with automatic, quick-action, high-speed brakes operating with 110-lb. train-line pressure, it was necessary to provide control equipment to permit the car brakes to operate under this condition or independently. The compressor is mounted on rubber pads to prevent its vibration from being transmitted to the car. Its work is lightened by the use of a slack adjuster of the piston travel regulating type. A pneumatic signal equipment is provided for each car.

Equipment for heating consists of 34 two-coil, truss-plank electric heaters along the side of the car beneath the truss angle, and two five-coil heaters in the vestibules. The car-body heaters have thermostatic control equipment, and also, provision for hand control has been made for use in case of failure of the automatic devices.

A feature of the auxiliary equipment appears in the trainmen's switch board for lights, fans and heaters, this being separated from the motorman's switchboard and provided with a completely protected front as shown in the accompanying half-tone. In this, each one of the panel doors has a latch so interlocked with the switches that it cannot be opened while any switch in that section is closed. The motorman's switchboard is of the usual type.


MOTOR TRUCK COMPLETE WITH MOTORS, THIRD-RAIL SHOES, SHOE FUSE BOXES AND BRIDGE FOR MOTOR LEADS


VIEW OF MOTOR TRUCK, SHOWING SPRING SUSPENSION FOR MOTOR NOSE AND PUSH RODS FOR CENTERING DRAWBAR

# Fitting the Electric Locomotive to Its Load*

## It Must Be Handled with Due Regard to the Ease with Which It Can Be Overloaded—Its Performance Can Be Predicted with Great Accuracy

By A. H. BABCOCK
Consulting Engineer Southern Pacific Railroad, San Francisco, Cal.

THE limit of engine capacity is the boiler. Because the electric locomotive boiler is stationary, and therefore may be of any size whatever, the electric ocomotive has inherently a greater possibility of development to large sizes than the steam locomotive. It is my purpose to indicate the limiting features in these respects and to show how the safe load of an electric locomotive is determined.

Steam railway men have been too busy doing things to have been able to follow the details of development of an art that only recently has touched their work directly. When they do come into contact with this development they are much surprised by the electrical engineer's claims for precision in his computations and the conidence with which he relies on his results; so surprised, in fact, that often they are in some degree skeptial. They have not been accustomed to methods of measurement of the order of precision of those commonly used by the electrical man; hence they are disposed to apply their own determination of engine rating, ften with expensive consequences.

When for example, the electrical man tells the steam man that an electrical locomotive is good for thirty ars, and the steam man tries thirty-five cars with no pparent result other than to discredit his information, e keeps on overloading the machine until it breaks down, and then he blames the electrical man for deigning a machine that is so unreliable. For these easons the fundamental principles of determination of ocomotive rating will be stated preliminary to deeloping the methods used in practice.

The effects of overloads on electric locomotives are ery different from those produced on the steam engine. n overload on a steam locomotive is simply a load that cannot pull. An overload on an electric locomotive oes not necessarily stop the train or even slow it down. he locomotive keeps going but the motors are burned ut. Safe load, then, is the maximum that can be ulled without excessive heating.

Heat is developed by the resistance of the conductors the flow of current through them, just as the temperature of air or water is raised by pipe friction, and he heat developed in electrical conductors is proportonal to the square of the current. If this heat is not d away, the motors "burn up," *i.e.*, the insulation on he conductors first is charred, which destroys its inslating properties, then the coils short-circuit and beme grounded, and finally, if the current is not cut off, he motor itself is melted away or even burned up.

It is interesting and perhaps may be illuminating to consider this a little in detail. One of the best illustations is the heating of the New York subway. Many rsons cannot understand why the subway is so oppressively warm. They do not realize that practically all of the energy transmitted into those tunnels appears there as heat, so that, in reality, a very large proportion of the output of the huge electric generators in the power house is actually heating the subway.

Returning to the motors, let us see how these heat losses are disposed of practically. The conductors in which the heat is developed are either buried in the iron or are otherwise entirely surrounded thereby. In the early designs of railway motors, radiation from the motor surface was the sole means employed for the dissipation of the heat. In later designs, by means of fan blades suitably placed on the revolving armatures, air is forced through ducts left in the iron for this purpose. The determination of the loading for any electric locomotive is seen to be not quite so simple as in the case of a steam locomotive. The simplest case is that of a long, constant-speed run without stops and with a fixed load. Variations in gradient and curvature do not complicate the study; as will be seen later they merely add to the detail. The most complicated case is that of a suburban or interurban railway where there are many stops, not necessarily the same from trip to trip, and with varying train consistency from day to day. The study of a situation less complicated than this, the Oakland, Alameda & Berkeley lines, monopolized the attention of an engineer and several computers for many weeks.

### ELECTRICAL MEASUREMENTS YIELD ACCURATE ELECTRIFICATION DATA

In general, the question may be viewed from two standpoints: (1) A given traffic is to be handled over a given line under an assumed or stated set of conditions; required, the locomotive specifications. (2) What will a given locomotive haul over a given line under existing operating conditions?

In Case 1 the first step is to compute roughly the general characteristics of the locomotive required to haul a maximum train over the line. If the sizes indicated thereby are unreasonable, then the train must be considered as made up of units that can be handled by one locomotive unit, and as far as the present figures are concerned this becomes the train to be studied. An alternative method is to divide the locomotive into several units and consider the whole train as a unit. In either case and in any event the problem reduces to a question of tons of train per motor.

Usually in any given installation Case 1 combines with Case 2. The simplest problem is to determine the safe load for an actual locomotive upon an existing line. From the manufacturer's or an assumed horsepower rating and the general characteristics of the line, a tentative loading is assumed, and a train is made up to correspond as closely therewith as may be possible.

The electrical engineer then connects a recording in-

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Abstract of paper read before the Pacific Railway Club, Feb 1 1919.

strument to measure the current taken by the locomotive. A pen attached to the instrument traces a line upon a strip of paper moved by a clock mechanism. This record then shows the current being consumed at every instant during the run, and from the area between the curve and the base line the average current is obtained. But since the heating is proportional to the square of the current, this curve will not give the desired information directly unless it is in circular form. If, however, the current is recorded by motion of the pen along the radius of the circle, since the area of a circle is proportional to the square of the radius, the area between the curve and the center will be proportional to the square of the current, from which by a very simple computation the required measure of the heating may be obtained. If the result so obtained gives a higher value per motor than the root-mean-square current guaranteed by the manufacturer, the locomotive is overloaded. Then by a proper consideration of the "empties" and underloaded equipment in the test train, a loading schedule for that type of locomotive can be specified for that particular run.

### Performance Can Be Computed With Aid of Manufacturer's Curves

In cases where the electric service is not yet in operation, and therefore where measurements of the current cannot be made, the currents can be computed with very great accuracy and a similar result reached. The process is as follows: The horizontal effort is determined first. For ordinary freight service reasonable tractive forces per ton of train, including locomotives, are: For acceleration, 10 lb.; for friction, 6 lb.; for grade (for each 1 per cent), 20 lb.; for curvature (for each degree), 0.8 lb.

The engineer's profile is now required, from which to take off the gradients and the curvature. Whenever these change, the horizontal effort per ton of train, derived from the constants given above, is set down against the distance over which the conditions are constant. Reference to the manufacturer's motor curve gives very accurately both the current required over this section and the speed at which the train will run.

It is convenient then to set down these quantities in tabular form, the columns being: (1) Engineer's stations; (2) distance (feet); (3) speed (from curve); (4) time (computed); (5) current squared (from curve).

The sum of the times gives the elapsed time between stations. The values in the "current squared" column plotted, as before, on polar co-ordinate paper, give the heating current. If the value so obtained exceeds that for which the motors are guaranteed a smaller train loading must be assumed and the computations repeated until the safe load is found. The accuracy of these computations is outside the experience of steam railroad men and often strains their credulity.

The worst feature of the whole matter lies in the fact that whereas an overloaded steam locomotive merely fails to get over the line and the crews have many explanations available, an electric locomotive pulls the load and does not lose a great deal of time, but it suffers damage, concealed unfortunately from all but the expert. The damage is real, nevertheless, and the day of reckoning, the day of burned-out motors, is as sure as taxes to follow. Meanwhile when the load has been pulled once, the overloading is continued and the engine failure is brought nearer. In the end the company pays the bill, and as a rule the real culprit escapes.

The difference between a properly supervised system and the other kind is found in the records of the O., A. & B. lines, and another system which shall be nameless. In the one case, not a single motor has been rewound due to overload since the service started in 1911, nearly eight years ago. In the other, three times as many armatures as the system owns are rewound every year, which means, of course, that on the average, every motor lasts only four months.

### Steam Road Men Surprised at Electric Train Performance

When the O., A. & B. installation was being engineered a committee representing the operating construction, maintenance, and motive power officials passed upon all questions of policy. When this committee was asked to consider speeds, station stops, layovers, etc., the members could see little use in spending much time on such details. When they were told that these are essentials in the layout of electric train schedules and that the trains would follow their predicted schedules within a few seconds, they hardly took the statement seriously. Later, the official trial train made the round trip from the Mole to Berkeley, with all the stops as scheduled, the gates not being opened but the train being held at every station for the number of seconds specified in the schedule. It reached the Mole within less than ten seconds of the predicted time, and the general manager congratulated us on the "good guess" we had made. Our reply almost made him laugh. It was to the effect that any other result would have justified him in asking for some resignations. The standard of electric operation in these particulars is so much higher than those of steam that in the early days of that service it was difficult to make the operating officials realize that what had been reasonably good performance before is no longer good enough. The operating standards had to be raised, and they were raised.

### Arguments, Pro and Con, Regarding Constant-Speed Motive Power

The practical operating official will see at once that any system in which the motive power tends to run at constant speed presents some favorable and some unfavorable operating features. One of the disadvantages is lack of ability to make up lost time. But on the other hand the tendency in such a system is not to lose time but to keep strictly to schedule. On all electric systems the dispatcher's duties are much simplified. No longer is he troubled with individual characteristics of engines or engine crews. If the train moves at all it moves on schedule time. On such a system, with operating conditions very closely approximating those of the Sierra of Tehachapi grades, the principal difficulty the engine crew has is to keep awake. After the train is in motion there is nothing to do but to watch for signals. Everyone in the cab, including visitors, is expected to confirm the signal indications when first reported by either of the engine crew.

When I visited this property a few years ago the dispatchers spoke most enthusiastically of the constant speed of the trains, which permits them to count on the arrival of the train at a given point within a fraction of a minute. As a result, any freight train is sent out on the line ahead of any passenger train whose schedule speed is no greater than the running speed of e freight locomotives, and the passenger train is not ld up.

The general superintendent told me that the largest ving was due to a better handling of the traffic, in at lost motion is eliminated. No stops are necessary r water or fuel and to blow up steam; for the trainen have less grounds for excuses for delays, and there a general "tuning up" of all hands. And this is what I meant when I said that the operating standards under electric operation are higher than those under steam operation.

The ability to determine with great precision the proper load for the electrical motive power, and its inherent tendency to a constant speed, make for a regularity of operation difficult for a steam official to realize until it come into his experience.

# Single-Phase Locomotives for Swiss Federal Railways*

## Two Types of Locomotives Supplied by Swiss Manufacturer for Freight and Passenger Haulage Present Some Interesting Details

THE general electrification of the Swiss Federal Railways was decided upon several years ago. In placing orders for the necessary locomotives, was originally intended to have these delivered in oups with different types so that their suitability r the conditions encountered could be tested under erating conditions and the results taken into account subsequent construction. It was later found impossle to follow this program due to the war. Four mple locomotives for the St. Gotthard line, however, re ordered early in 1917, and an order for twenty ditional locomotives was placed in 1918. Half of s latter order was placed with Brown, Boveri & mpany. Some details of the four sample locomotives, ether with some other types developed, were given the issue of the ELECTRIC RAILWAY JOURNAL for pt. 7, 1918, page 411. Of the locomotives now under struction by Brown, Boveri & Company, two types shown in the accompanying illustrations. One of se is an express locomotive, the other a freight omotive. As both types have the same general prinles of mechanical and electrical construction, a deiption of the express locomotive will serve for both. e express locomotive has two trucks, each provided h one leading and two driving axles. The two trucks joined by a spring coupling device which provides transmitting the reciprocating forces direct from truck to the other, and so improves the general ning by relieving the flange pressures of the inner ving wheels at curves.

or transmitting the power from the motor to the ving axles spur gears and coupling rods have been pted. Each truck is provided with two motors red to a common intermediate shaft which is ced to the driving wheels by means of the coupling . The latter are arranged one on each side of locomotive with an angular displacement of 90 deg. pinions on the motor shaft are fitted with springs give circumferential flexibility. This arrangement adopted to equalize the tooth pressures on the two ons and to compensate for the sudden alterations of ue chiefly due to the coupling rod drive with its nging reciprocating forces.

wo strongly constructed center pins supported from the trucks take the weight of the locomotive body and the electrical equipment. One of these pins is centered in the truck, while the other has sufficient play in a longitudinal direction to insure that the driving forces are taken by the coupling device and cannot be transmitted by the center pin. Two auxiliary supporting points between the truck and frame are arranged just at the inner side of the inmost driving axle. These are necessary to obtain an equal distribution of load on the axles. To insure stability of the frame in the transverse direction, light springs are provided, two placed on the truck frame at the side of each center pin.

The locomotive body is built of sheet iron with suitable heavy stiffening pieces. In order to provide easy access to the driving gear and spur wheels, the lower portion of the body is made in the form of a girder. A driver's cab is provided at each end of the locomotive. All electrical apparatus other than the motors is installed in the body of the locomotive proper. The motors are provided with fans mounted on top and projecting through the floor of the locomotive. This necessitates relatively large openings in the floor, and to prevent the entrance of snow, etc., into the interior of the locomotive these holes are closed by movable cover plates.

Westinghouse brakes of the automatic and regulating type are provided and are arranged so that the brake rod of each truck can be operated by hand. There are four brakeshoes provided for each driving axle, and the leverages are so proportioned that the pressure of all shoes is the same. Compressed air for the brakes, sanding device, whistle, and some of the electrical apparatus, is furnished by two Brown-Boveri air compressors. The total weight of the express locomotive is 237,200 lb., and that of the freight locomotive 266,800 lb. The mechanical portion of the locomotive was designed and constructed by the Swiss Locomotive & Machine Company of Winterthur.

The control switches with their operating apparatus are mounted together with the transformer so that the whole forms a complete unit which can be installed or removed bodily through an opening in the roof. As a result of a thorough investigation into the cooling of transformers under actual running conditions during many years, the manufacturer has installed oil-cooled transformers. The oil is forced by a circulating pump through a system of cooling pipes fitted to the sides of the locomotive. The transformer is designed

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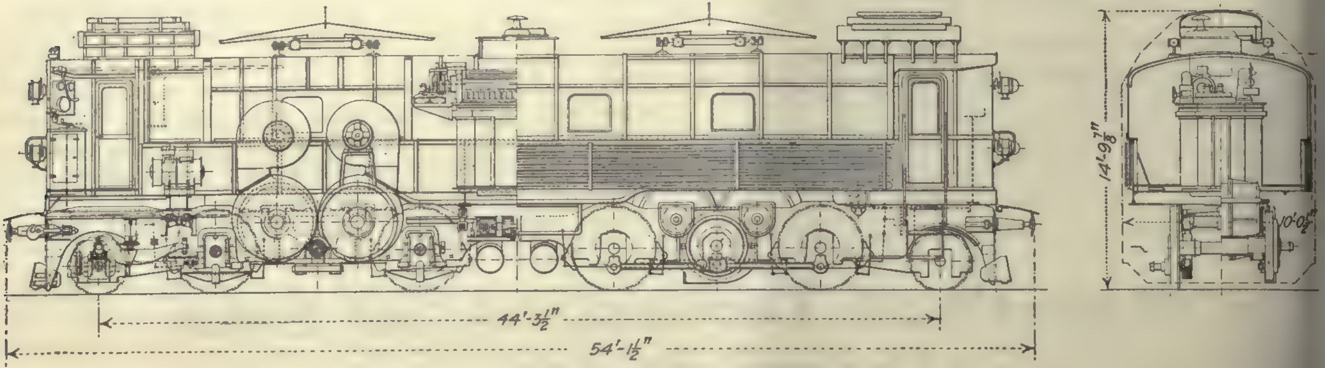
*urther details concerning the construction and equipment of the locomotives will be found in an article by J. Buchli, chief eer locomotive department, Baden Works, Brown, Boveri & Co any, in the issues of *Engineering*, London, for May 2 and 9, 19, from which the illustrations and information for this art e have been taken.



EXPRESS LOCOMOTIVE FOR SWISS FEDERAL RAILWAYS

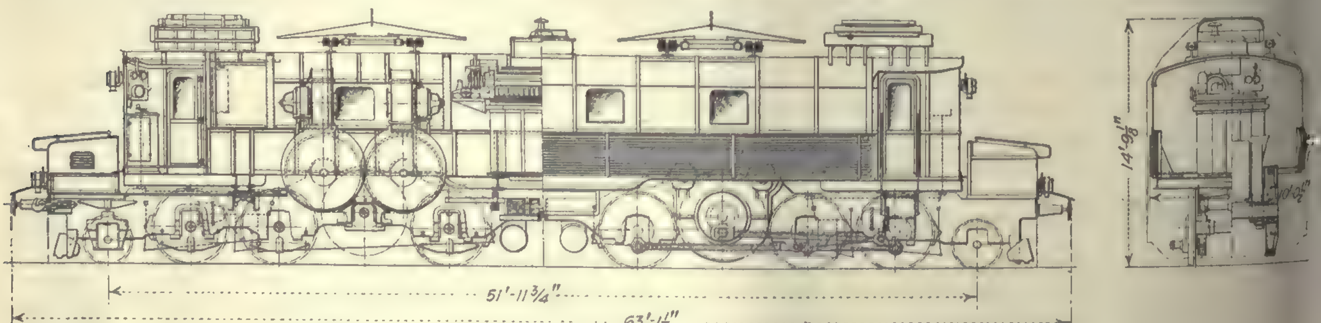
for a continuous output of 1750 kva., the high-tension side being wound for 15,000 volts but adaptable for 7500 volts. The secondary pressure is 1325 volts at no load, and the frequency is 16⅔ cycles per second. The transformer complete with pumps and separate coolers weighs 27,800 lb., and is 7 ft. 1 in. long, 4 ft. 11 in. wide, and 5 ft. 2 in. high to the cover.

The two motors of each pair are connected in series, while the two pairs are in parallel with one another. The series arrangement is allowable as the mechanical coupling of the two motors insures an equal distribution of the voltage. The series connection was preferred on account of the saving in copper for the connecting cables, as well as in the weight and space due to the current being one-half of that with parallel connection. The motors are ventilated, air being drawn in from the interior of the locomotive and blown out underneath. The motors are of the single-phase, series type with compensating winding and commutating fields with phase displacement. There are twelve brushholders to each commutator with a total of twenty-four brushes each, 2½ in. broad and ⅝ in. thick. Between the armature conductors and the commutator there are resistance connections. For regulating and altering the voltage supplied to the motor, the low-tension winding of the transformer has nineteen tappings; one of these, however, being a ground connection. The voltage increases per step are not always the same, these being smaller at the middle than at the end tapping. This arrangement of regulation was adopted so that when the limit of adhesion between the wheels and rails was reached, a finer regulation in the tractive effort can be made.

The leads are brought out through the transformer cover direct to the tapping switch. This latter apparatus differs considerably from the type usually adopted for this purpose. It consists of two cell-type switches used in conjunction with storage batteries but combined so as to form a single unit. This tapping switch, as well as the other control apparatus, is operated by direct-current motors. A small motor-generator in conjunction with the storage battery supplies the necessary current. The control is of a multiple-unit type so that two locomotives can be operated from a single cap.

The railway authorities insisted that each locomotive be provided with an electric brake. This was specified to avoid the dust produced at the wheels of the locomotive and to lessen the wear on tires and brakeshoes. The fine iron dust produced in large quantities during braking finds its way into the interior of locomotives, especially when assisted by the suction of the motor fan. Here it is deposited on the windings of the apparatus and in the motors, thus giving rise to trouble and insulation breakdowns. Very steep gradients are encountered on the Bernese Alpine Railway, and the quantity of dust produced from braking amounts to as much as 40 tons per year. On some of the locomotives still on order, it is proposed to use an improved system of electric braking so that power may be returned to the line.

The following service requirements are specified for these locomotives: Express locomotives must be able to haul a net load of 300 tons at a speed of 31 m.p.h. on a gradient of 2.6 per cent, while the freight locomotive, in addition to having a speed of 31 m.p.h. under the same conditions, must reach 21½ m.p.h. with a net load of 430 tons. It is further specified that both trains must be able to be started from rest to full speed in four minutes on the same gradient. The overload demanded is 20 per cent for fifteen minutes at a time. The normal full-load conditions represent an output of 4500 hp. (one-hour rating) per locomotive at the motor shaft, with a tractive effort of 27,500 lb. and 37,500 lb., respectively, at the circumference of the driving wheels. These amounts are increased to 35,500 lb. and 48,500 lb. during starting on an upgrade.



FREIGHT LOCOMOTIVE FOR USE ON SWISS FEDERAL RAILWAYS

# Types of Third-Rail Used in Railway Electrification

EVEN ON SHORT RADIUS CURVES THE THIRD-RAIL PROVIDES A RELIABLE POWER CONNECTION

**The Leading Types of Third-Rail Construction Now Used Are Discussed, Their Important Features Are Considered and Their Advantages and Disadvantages Are Compared**

TO CONNECT the stationary electric power generating and distributing system with a moving car or train which uses this power it is necessary to provide a contact system. Such a system consists of two parts, the stationary or distributing part and the moving collecting device. In order to keep the parts out of the way and for safety early systems used an overhead construction for this distributing device. As cars became heavier and the speeds at which they were operated were increased, heavier duties were placed on the connecting system. This required a continuous conductor of larger section and what is now commonly known as the third-rail construction was resorted to. To the railway man the handiest form of a large section onductor was the ordinary T-rail. At first, attempts were made to use this as a continuous conductor, and a ravity contact device was adopted which slid on the ead of the rail.

### THIRD RAIL DESIGN FOR ELECTRIFICATION

In considering the design of a steel rail to act as conductor and at the same time to give a good contact urface for the collection of current by a moving train everal important features must be considered. A eview of some of the designs which have been used nd a comparison of the advantages of the respective ypes are given in this article.

Third-rail installations may be divided, roughly, into three classifications as to their point of contact with the collecting device, namely, over-running contact, under-running contact, and side contact. The earliest installations were over-running or top contact in which the collecting device passed over and made contact with the open top of the third-rail. The first installation used a form of collector which depended on its own weight for contact with the third-rail, and the installation was exceedingly simple. These first installations were on elevated systems where there was little or no danger of the public coming in contact with the rail. Later, when the use of the third-rail contact system was taken up by interurban roads and for steam road electrification where there were possibilities of accident to the public from coming in contact with a bare conductor, it became necessary to devise some better means for protecting the rail. This led to several types of protected third-rail, and later to the under-running and side-contact construction. In the accompanying illustrations examples of each of these types are given.

In considering the points of merit in the various designs it is advisable to classify the leading features necessary for the development of a sound, practical type of construction. The points to be considered may be classified as follows:

1. Rail section, selected with respect to: (a) Ease of obtaining, (b) ease of handling, (c) danger of damage, (d) conductivity, (e) ease of attaching protec-

tion, bonds, anchors, etc., (f) sufficiency of wearing face.

2. Location, determined by: (a) Small space desirable, (b) special work construction, (c) creepage distance to ground, (d) limitation of trouble from derailment, (e) clearance.

3. Protective covering, designed to: (a) Prevent contact, (b) protect against weather.

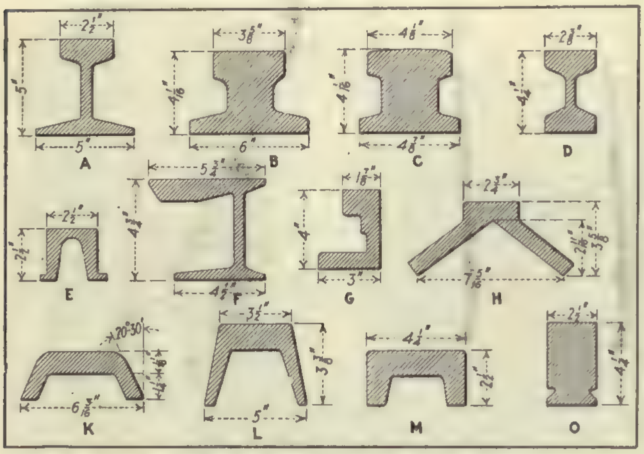


FIG. 1—DIFFERENT THIRD-RAIL SECTIONS

4. Ease of installation and maintenance, with respect to: (a) Necessity for special ties, (b) expensiveness of cable work involved, (c) provision for gaps in third-rail, (d) reballasting and tamping required, (e) interference with signal system.

### THIRD-RAIL SECTIONS HAVE INCREASED IN WEIGHT

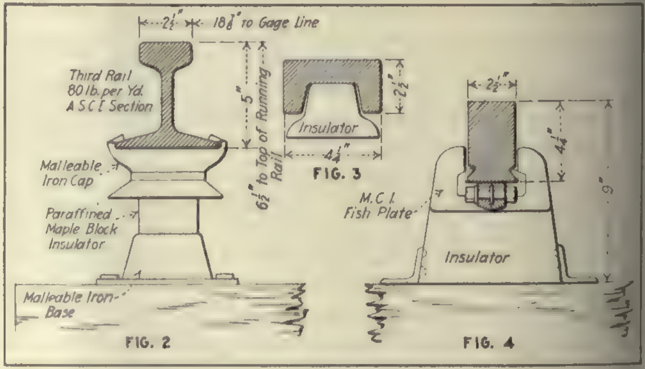
The first type of third-rail used was a standard T-section, adopted principally because it was most readily available at the time. Since then this standard section has been used extensively in various weights from 40 to 150 lb. per yard and probably most of the third-rail lines in operation to-day still use this type. The lighter weights were used extensively in the first installations, but were found to be not as satisfactory as the heavier rail. They have been practically abandoned except for use in yards where high conductance is not necessary.

Conductivity depends on the hardness of the rail, and the importance of conductivity varies with individual ideas of the designers. Generally speaking, the resistivity of third-rail is from six and one-half to eight times that of copper. The third-rail steel is considerably softer than the material used for track rails which has a resistivity of from eleven to twelve times that of copper. The principal reason for the large variation in ideas as to the proper conductivity for third-rails, is due to the question of maintenance economy. The life of the rail decreases as conductivity is increased. Furthermore, it is necessary to use more care in handling a soft rail than a hard one. The advantages and disadvantages of each quality must, therefore, be balanced against each other to determine the best one for a particular case.

From observation of the life and resistance of existing installations it has been found that some rails flake away in large pieces, so that the track is strewn with sheets of rust. This tends to reduce the conductance of the rail and also causes short-circuits on the line. While it would seem that painting or weatherproofing of third-rail would prevent this trouble, it has not been generally resorted to, although trial installations have been made. While it is reported that painting effectively deters corrosion, still it does not appear to be generally favored, due to its increased cost and also to the difficulty in handling painted rail without damaging the paint.

The great advantage of the heavy rails lies in their increased conductance which tends to render unnecessary a paralleling feeder system. The length of rail used affects the labor of handling and the number of bonds necesary to a large extent. The present practice of bonding presents no particular difficulty where third-rails are properly supported and anchored. There has been a great deal of experimental work conducted with new and original sections for use as third-rail. The chief two considerations which led to these were (1) to produce a section which had a greater contact surface in proportion to its weight than the ordinary T-rail, thus giving a greater wearing surface and longer life, and (2) to obtain a section which could be more easily supported and which would provide greater facility for bonding, anchoring, insulating, etc., than the ordinary T-rail.

A number of third-rail sections in use are shown in Fig. 1. The section shown at *A* is the 80-lb. standard T-rail section commonly used. *B* is a special section used by the Long Island Railroad and *C* is a similar section used by the New York Municipal Railway. All of these three are used for over-running contact. Sections *B* and *C* are of the same weight, but *C* has the advantage of greater contact surface. The section shown at *D* is that used by the New York Central Railroad on rails with under-running contact. It was designed to provide a better support for this type of construction than was available with the standard T-section. Section *E* is that of the Philadelphia & Western Railway, which was originally designed as an under-running rail, but has since been inverted, a change which was found necessary to meet local conditions. The section shown was selected by the railway's engineers because of their belief that it would reduce the first cost and maintenance, eliminate leakage losses, increase the clearance and provide for automatic operation of the shoes.



OVER-RUNNING UNPROTECTED THIRD-RAIL CONSTRUCTION

Fig. 2—Standard T-rail type. Fig. 3—Wide-contact design. Fig. 4—Compact construction.

Section *F* is a recent under-running type of rail used by the Central Argentine Railway and *G* is the section used by the Lancashire & Yorkshire Railway with the side contact system. The remaining sections shown are special types for over-running third-rail, and special shapes brought out to provide a more satisfactory means for supporting these sections and also for supporting a protective covering.

### INSULATION FROM RAIL TO EARTH

A long insulator leakage path to ground is found necessary to prevent the current leaking across and burning during wet weather. This problem, however, has presented no formidable obstacle. The insulator must allow a longitudinal movement of the rail for expansion and contraction but must hold it securely against lateral motion. The vibration set up by heavy cars in some cases has produced strains sufficient to crack the insulators. Good results have been produced by interposing a shock-absorbing material, such as felt or canvas, between the cap and the insulator and allowing for vertical movement of the third-rail.

For voltages higher than 700, porcelain insulators have proved most satisfactory and these are now being generally used for all third-rail construction. These are provided with a lip or petticoat so that the insulators will be washed by the rain, and all metal parts are reduced to a minimum to obtain as much creepage surface as possible. In practice it has been found quite unnecessary to have heavy caps and bases cemented upon the insulators. These include waste metal and act as an additional element of danger. The first design included lugs on insulators to prevent the conductor rail from moving up and down. This type of construction is shown in Figs. 2 and 5. The lugs were found to be needless and in fact proved disadvantageous, causing breakage of the insulators. They also add to the difficulty of installation of the rail. The latest type of construction includes vertical lugs of such a height that the depression of the ties with passing traffic will still leave the lugs high enough to prevent the dislodgement of the conductor rail.

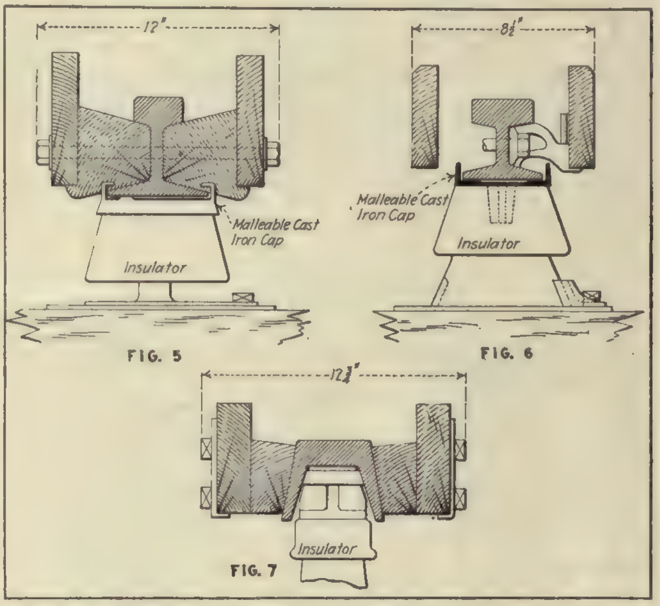
The several designs of third-rail construction illusrated permit the making of some comparisons of the lesirable features as enumerated on page 1142. Without considering the questions of cost of installation and naintenance but having in mind the practical advanages of the various designs presented, it is possible to btain some idea of the improvements made and their alue in actual service. From the illustrations shown t will be seen that there is a considerable variety in se. Very little attention has been given to possible tandardization, and the amount and importance of this onsideration is bound to vary with individual ideas.

### COMPARISON OF TYPES OF THIRD-RAIL CONSTRUCTION

The designs shown in Figs. 2, 3 and 4 are the unrotected over-running types. In the first of these a tandard rail section is used which admits of easy onding and connecting up. The section shown in Fig. presents a wide contact surface and at the same time xposes a large unprotected surface. It has been used nprotected owing to special construction of bridges and ack when a shallow rail is necessary to obtain suffient clearance to earth and to insure the required earances. It cannot be considered seriously for exnsive railway electrification when compared with other esigns. It fails in the essentials of the amount of ace occupied and the distance from rail to earth, and e section does not permit of the easy attaching of nds and anchors. The arrangement shown in Fig. 3 is a very compact section and has many advantages, but the drilling of bond holes through 2½ in. of metal, as is necessary with this design, is a decided disadvantage. There is also a tendency for this type of rail to "whip" and become top-heavy. As all of these types are unprotected they are suitable for use only on elevated railroads or on roads with private right-of-way.

The designs shown in Figs. 5, 6 and 7 are for over-running contact and have side protecting boards to afford safety against inadvertent contact.

Fig. 5 shows a type of construction which provides for the use of the standard section of third-rail and has the advantages already enumerated for this type. The disadvantages of this design are the large amount of space occupied and the wide opening through which the conductor rail is exposed. The protection afforded is not so great as would be desired for many installations, especially where there are severe weather conditions of sleet and snow.



OVER-RUNNING, SIDE-PROTECTED TYPE OF CONSTRUCTION

Fig. 5—Sides bolted to conductor. Fig. 6—Sides supported by brackets. Fig. 7—Inverted "U" section.

The design shown in Fig. 6 is a considerable improvement over the preceding. The space occupied laterally is 3½ in. less and at the same time a good contact surface is provided. It has greater clearance to earth and excellent provision for mechanical attachments. The cap is of light dimensions and the lugs are of the latest design. A disadvantage is that insufficient protection is provided against sleet and snow. In the design shown in Fig. 7 a special section is employed. The space occupied is large and the surface is exposed more than is desirable. In this type also the insulator is covered up, which is a most undesirable feature as it allows the accumulation and baking of dirt which might cause short-circuits.

The types of construction shown in Figs. 8, 9, 10 and 11 have been developed with especial reference to providing an efficient protective covering against severe weather conditions and they also provide protection against contact. That shown in Fig. 8 is the new, protected, over-running T-rail type used on the main lines of the Philadelphia & Western Railway. The clearance provided for this type of construction is well within the clearance lines specified by the American Electric Railway Association and the American Railway Association.

The rail shown in Fig. 9 is that used by the Pennsylvania and Long Island Railroads. The cost of maintenance with this has been found to be exceedingly low and this type has the important virtues of having simple parts, providing flexibility and ease of maintenance and installation. It can easily be repaired in cases of derailment. All clearances conform with the standard of the American Railway Association. The rail section used is extremely heavy, 150 lb. per yard. A special chemical composition is used which is low in carbon and other hardeners, and gives a resistivity about eight times that of copper instead of about twelve times as is the case with the ordinary track rail. This heavy section was adopted on account of the very heavy currents used for individual trains where the traffic is exceedingly dense, which required a large current-carrying capacity and high conductance in the collector system.

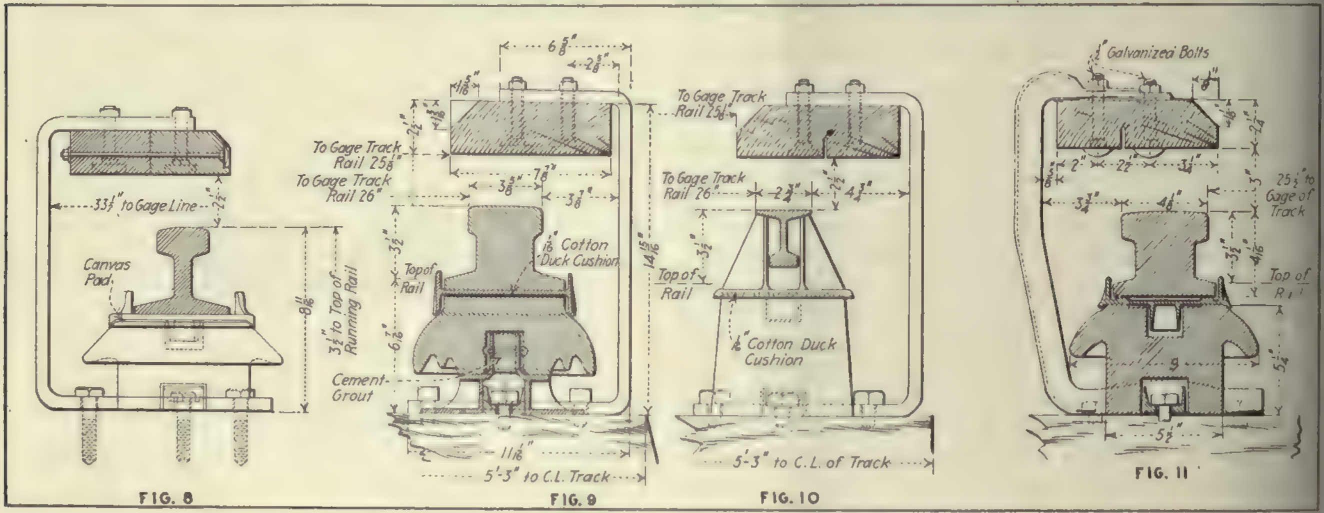


FIG. 8 FIG. 9 FIG. 10 FIG. 11

OVER-RUNNING, TOP-COVERED TYPE OF THIRD-RAIL

Fig. 8—T-rail on main lines of Philadelphia & Western. Fig. 9—Pennsylvania type for tunnel section. Fig. 10—Pennsylvania type for yard track. Fig. 11—New York municipal standard.

In yards where the large section of third-rail is not needed for conductance and where it is necessary to have the maximum of clearance for signal and other apparatus along the track, a standard T-rail section has been adopted. This is shown in Fig. 10 and consists of a section of 25-lb. standard Bessemer T-rail mounted in an inverted position. The base of the rail constitutes the contact surface.

The heavy-section rail is bonded with ribbon type compressed-terminal foot bonds, four to a joint, having a conductance equivalent to 80 per cent of that of the third-rail. The light-section rail for the yards is bonded with the protected-type pin-terminal cable bonds. The protective covering in both cases consists of a continuous plank carried on wrought-iron brackets secured to the third-rail ties, which are longer than the standard ties. On the open line this plank is of yellow pine but in their tunnel construction they use Jarrah wood imported from Australia. This is used on account of its slow-burning qualities.

The type of construction shown in Figs. 11 and 12 is that used by the New York Municipal Railway Corporation for its rapid transit subway service. This is quite similar to the Pennsylvania Railroad construction but employs a different type of supporting bracket and different insulators and third-rail section. The weight of the section is the same as that used by the Pennsylvania Railroad but a larger contact surface has been obtained by reducing the supporting surface somewhat. The construction shown in Fig. 11 is the standard type used on the majority of the New York Municipal lines, and that shown in Fig. 12 is a special type which was made necessary due to small clearances and tunnel construction. In the latter the supporting bracket has been rounded at the base to provide clearance with the lining of the tunnel, and the insulator is 2 in. less in height than the standard insulator.

Another type of construction with the overhead protecting board in which a special third-rail section is used is shown in Fig. 13. This is used on branch lines of the Philadelphia & Western Railway where the original contact rail was reversed. The original type, of under-running construction, is shown in Fig. 15. All clearances are well within that adopted by the American Railway Association.

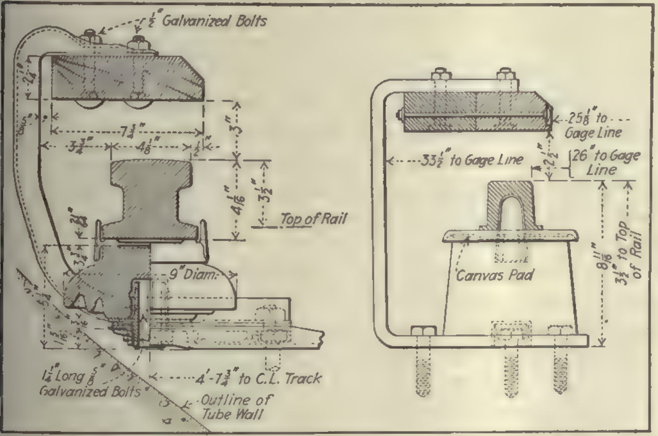
Three types of under-running-contact, protected-type third-rail are shown in Figs. 14, 15 and 16. In Fig. 14 is one used by the New York Central Railroad Company and by the Philadelphia Rapid Transit Company. By inversion of the rail its protection on both top and sides was made a comparatively easy matter and the bottom was left clear for contact with the collecting device. This construction is somewhat more costly than the over-running type on account of the types of insulators which must be used. These are mounted in cast-iron brackets bolted or lagged to long ties, which must be high enough to hold an insulator below which the third-rail is suspended. They must be rigid enough to bear the weight on them without excessive vibration and on account of their shape this requires a somewhat heavy section. The board protection is supported on these brackets or upon the third-rail itself. This under-running type of third-rail has the decided advantage of being self-cleaning in stormy weather and is operated without trouble even when the rail is deeply covered with snow.

The design shown in Fig. 15 is the under-running type formerly used by the Philadelphia & Western Railway, as previously stated. This type of construction was changed to that shown in Fig. 13 as it was found possible to design the top-contact third-rail at a much lower cost. Experience with this type showed that, while it provided for longitudinal movement due to expansion and contraction, no provision had been made for movement in a vertical plane. The vibration set up by the heavy cars brought such enormous strains upon the insulators that in many places the only insulation left was that afforded by the tie. Furthermore, it was found very difficult to locate defective insulators. The clearances did not come within the standard adopted by the American Railway Association and it was desirable that this be changed so as to conform thereto.

The design shown in Fig. 16 is the most recent type of under-running contact rail used by the Central Argentine Railway on its line from Buenos Aires to Tigre. The third-rail voltage is 800. The advantages claimed for this type of construction are compactness, protected surface, good insulation and safety. The practical advantages in the use of this rail have been demonstrated under most severe conditions and have given most satisfactory results. The section of third-rail employed is special for this particular type of construction.

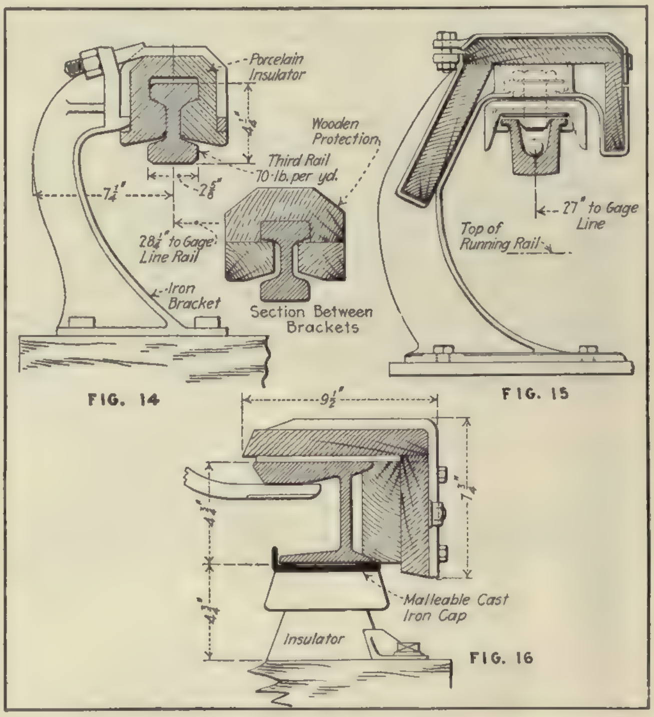
### HIGH-VOLTAGE DESIGNS

Before leaving this subject of third-rail installation it is important to examine some of the designs which have been used on systems using a higher voltage than 600. That shown in Fig. 17 is a side-contact type successfully used by the Lancashire & Yorkshire Railway between Manchester and Bury, England. This rail is electrified at 1200 volts and there is complete protection to the conductor rail. There are, furthermore, no metal parts or attachments connected to the conductor rail, all supports for protection being provided by means of clamps. The wooden key shown at *A* is used for clamping up the sides of the protection. A space shown at *B* is left for drainage. This design has a large range of adaptability and is eminently simple in construction.



FIGS. 12 AND 13—BRACKET-SUPPORTED TOP-COVERED TYPES

In speaking of the various types of third-rail construction Alfred Raworth, electrical engineer for the South-Eastern & Chatham Railway of England, who spent considerable time in this country studying American practice, said that he considered the Lancashire & Yorkshire type of third-rail construction to be particularly well adapted for conditions in Great Britain. Various lines there have trestles and tunnels which limit the space available at the side of the track and this type of construction sets in close to the track and can be more readily installed than some other types. It would appear, however, that under such climatic conditions as exist in the northern part of the United States more difficulty would be experienced in the winter months with the collection of snow and ice in this slot than is the case with some of the other types of construction already described.



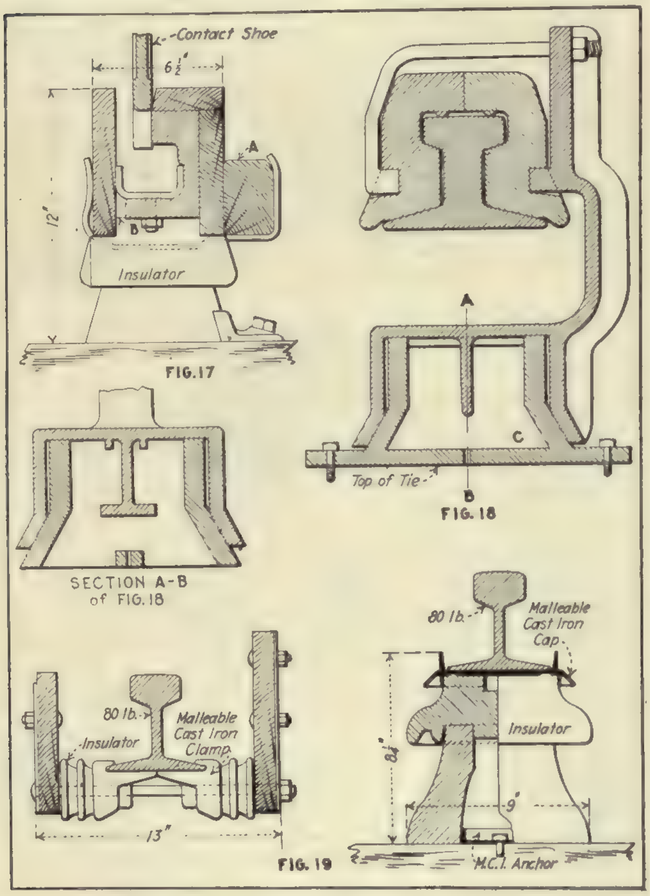
UNDER-RUNNING, PROTECTED TYPE OF THIRD-RAIL CONSTRUCTION

Fig. 14—New York Central type. Fig. 15—Philadelphia & Western old type. Fig. 16—Special type used abroad.

The arrangement shown in Fig. 18 shows a suggested type of third-rail support and protection suitable for high-voltage operation of which a description was published in the March 6, 1915, issue of the ELECTRICAL RAILWAY JOURNAL, page 469. Porcelain insulators held in place by U-shaped pieces of flat strap iron are used. These insulators also serve as the supports for the protection proper, which is simply an inverted trough. The design permits of rapid and cheap erection and at the same time provides high insulating qualities.

Special interest attaches to the third-rail construction of the Michigan Railway shown in Fig. 19, because it was the first to be installed for a voltage of 2400. An 80-lb. T-rail section of low-carbon steel especially rolled for this road is used. The specifications provide for carbon not over 0.14 per cent, manganese not over 0.40 per cent, sulphur not over 0.08 per cent and phosphorous not over 0.11 per cent. The rail is guaranteed to have a conductivity one-eighth that of copper. The contact rail is carried on a three-petticoat insulator, which in turn rests on the 10-ft. track ties. The method of supporting the protection board is unique and well designed. Here again there is a top-running system with a wooden trough 12 in. wide, with the live rail exposed in the center.

On continuous stretches of 1 mile or less in length the Michigan Railway third-rail is laid with expansion joints one and one-half times as wide as those allowed in standard track joints. Where the stretch of the third-rail is more than 1 mile long, twice the standard track expansion is provided at joints. The petticoat type insulators are tested at 5000 volts and are held in place on the ties by square malleable lugs fastened with lag screws and fitted into recesses in the insulator bases. Third-rail joints are bonded with 7-in. 500,000-circ.mil bonds of the copper-ribbon compressed-terminal type.



SOME HIGH-VOLTAGE TYPES OF THIRD-RAIL CONSTRUCTION

Fig. 17—Side contact system. Fig. 18—High-voltage third-rail support. Fig. 19—Michigan 2400-volt line; at right, third-rail mounting; at left, protection board supports.

In deciding upon any particular type of conducting system the cost of maintenance, operation and efficiency must all be taken into consideration. The cost of third-rail construction is considerably below that of overhead construction, yet conditions may be such that the advantages of overhead construction are of sufficient importance more than to justify the additional expenditure. Some roads may present ideal conditions for overhead work and considerably reduce the cost of erection, but at the same time expensive alterations for the safe installation of third rail may be involved, materially minimizing the difference in cost and give the advantage in favor of overhead work. Of course, having the track free from live rail with the line accessible at all times is a great point in favor of overhead work and is much appreciated by those whose business it is to maintain the permanent way. The important item of maintenance of track will be increased owing to the use of third-rail. This is obvious since repairs cannot be carried out with the same facility. Therefore the additional cost of upkeep might justly counterbalance the interest on the extra capital expenditure on overhead construction.

## Hardening Rail Joints on Southern Pacific Electrified Division at Oakland

THE usual battering of receiving rail ends at joints on the electrified divisions of the Southern Pacific Railroad at Oakland, Cal., drew attention to the advantage there would be in some means of hardening the heads of the rails at joints. Contract was accordingly made with a San Francisco firm for applying heat treatment to the 1200 joints, approximately, on the Ellsworth line by way of an experiment. The rails on this line are standard 90-lb. A. R. A. It was decided to treat the rail head for a distance of 8 in. from the joint each way. The hardening system used is one which has been employed quite extensively by electric railway companies on the Pacific Coast. It is based on the theory that iron or steel, when brought to a high temperature, will absorb the carbon and other elements necessary to harding if solutions of salt, sulphate of copper, and potassium are applied to the surface in the presence of a hot gas with a high carbon content. The tempering is affected by chilling the rail suddenly with water. An account of the application of the process to track of the United Railroads of San Francisco was published on page 704 of the issue of this paper for Oct. 19, 1918. The Ellsworth line, to which the Southern Pacific engineers decided to apply it has a twenty-minute service all day and the rails had to be treated between the passing cars.

After the work had been in progress for about three weeks the division engineer inspected 565 treated joints. Of these twenty-four were found to be slightly chipped and six badly chipped although not so seriously as to condemn them. It is believed that when properly applied this treatment, will double rail life. The hardening process has the advantage of being applicable to rails or to special work which has been repaired or which had been built up with new metal by means of a welding process.

If further experience with this process bears out the present opinion, a very material saving in first cost and maintenance of track is expected. Its application is attractive on the Pacific Coast particularly because of the freight and delay incidental to the delivery of manganese special work there. During the war the Southern Pacific Company figured it would be cheaper to use common steel crossings built up at the Sacremento shops in place of manganese crossings even if it should be found that the former had to be renewed every year. Common steel crossings hardened by the heat treatment process are reported to have given excellent service.

The Imperial Government Railways, Japan, are reported as about to make a trial of wireless telegraph communication to its railway trains. Accidents on the railway have previously been made known to the locomotive engineer by flags or other signals, and these have sometimes failed to give proper warning. It is thought that the use of wireless communication will add a measure of safety. Certain railway stations will be selected as wireless stations.

FREIGHT HAULAGE WITH A SELF-PROPELLED MOTOR CAR

# Branch Line Operation with Self-Propelled Motor Cars

### Results Obtained in Operating a Gasoline-Electric Car on the Minnesota Northwestern Railway for the Last Four Years Are Given, Together with an Account of the Service Rendered

By H. W. PROTZELLER
General Manager Minnesota Northwestern Electric Railway

THE economical operation of the large trunk lines of railroads in this country depends to a large extent upon making the branch lines or feeders self-supporting. These branch lines must be made to pay their operating expenses and fixed charges from their own gross revenue, thus relieving the main lines of their burden of support. A very large number of them are now being operated with the cast-off equipment of the main lines, and practically every one of them is daily piling up deficits. To reduce or wipe out these deficits, they should have more economical and efficient equipment.

The need for self-propelled motor cars as adjuncts o the regular equipments of steam railroads has been pparent for many years. These cars provide a clean, uick and attractive service and are capable of being operated by the minimum amount of labor. However, there has always been an impression in the minds of most railroad officials that the self-propelled motor car is a piece of equipment that has to "puff and snort" pretty hard in order to drag its own weight over the rails and that when any real work is to be done it is necessary to rely on steam equipment. Actual results show that the self-propelled car will handle all of the passenger, express and freight business that is usually met with on the branch lines and do it at a cost far below the amount that is now being spent for the operation of steam equipment.

The Minnesota Northwestern Electric Railway has been operated since August, 1914, by means of a gas-electric self-propelled motor car. One car of the type shown and described has successfully handled all of the

GASOLINE-ELECTRIC MOTOR CAR ON MINNESOTA NORTHWESTERN ELECTRIC RAILWAY business. The data shown are an average for four years' operation. The cost figures are necessarily higher than would have obtained a few years ago. The cost of operation per car-mile also includes the haulage of a considerable amount of freight.

The line of the Minnesota Northwestern runs a distance of 20 miles from Thief River Falls, Minn., a town of 6000 inhabitants, to Goodridge, Minn., a town of 500. When the line was originally planned the intention was to construct 20 miles each year, but these plans were frustrated by the war. At Thief River Falls there are connections with the Minneapolis, St. Paul & Sault Ste. Marie Railway and the Great Northern Railway. The passenger and freight depot of the Soo Line is used for the Thief River Falls terminus of this line. The entire territory that the line runs through is a partially developed agricultural section that twelve years ago was Indian reservation. All of the business obtained along the line is from agricultural products or products manufactured for consumption in the district. The line runs through open prairie country, so that the grade was made entirely by means of side borrow work. The borrow pits were made continuous in the form of ditches for thoroughly draining the right-of-way. The roadbed consists of 72 lb. per yard steel rails laid on 6-in. x 8-in. tamarack ties, spaced eighteen to the 30-ft. rail. The line is gravel ballasted practically the entire length. The maximum gradient is 0.3 per cent and the maximum curvature is 6 deg.

### EQUIPMENT IS GASOLINE-ELECTRIC

The type of equipment used is a gasoline-electric motor car, manufactured by the General Electric Company, of Erie, Pa., and designated Type RE-70-B-11, of the following general dimensions:

| | |
|---|---|
| Length over bumpers | 70 ft. 1⅜ in. |
| Length of passenger compartment | 30 ft. 5⅜ in. |
| Length of smoking compartment | 12 ft. 5 in. |
| Length of baggage compartment | 10 ft. 11 in. |
| Length of engine compartment | 11 ft. 11 in. |
| Distance between bolster centers | 53 ft. 7 in. |
| Total wheelbase | 60 ft. 0 in. |
| Net weight of car | 52 tons |
| Drawbars | Front, ¾ M.C.B.; rear, full M.C.B. |
| Width over all | 10 ft. 6⅜ in. |
| Height above rail | 14 ft. 7¾ in. |
| Journals | 5½x10 in. and 5x9in. |

The frame of the car is constructed entirely of steel, suitably cross-braced with I-beams and channels. The outside sheathing is of steel plates. The floor is made up in three layers of steel, wood and felt. The interior trim is of mahogany with a composite ceiling. The windows are fitted with plate glass and can be opened to a height of 2 ft. The seats are of the bench type with spring backs and seats, heavily upholstered in plush in the main compartment and leather in the smoker. The seats are wide enough to accommodate three passengers comfortably. The interior of the car is brilliantly illuminated by means of incandescent lamps. The heating is by means of hot water furnished from a Peter Smith heater in the baggage compartment. The seating capacity is ninety-one.

Energy is transmitted from the gas engine to the driving wheels by means of electric drive. The power plant consists of an eight-cylinder, 550-r.p.m., 4-cycle gas engine of the "V" type, rated at 200 hp., direct connected to a 600-volt generator of 80-kw. capacity, but which is capable of very large overloads for short periods. The generator supplies power to two Type GE-205 railway motors of 100 hp. each, mounted on the front truck, and gear-connected to the axles. The air-brake equipment consists of an air compressor of 22.5 cu.ft. per minute capacity, directly driven from the main engine, with an auxiliary compressor of 45 cu.ft. per minute driven by a separate engine set of 5 hp., which also drives the generator for supplying electricity for car and headlights. The auxiliary compressor is used for starting the engine by means of compressed air. The brakes are General Electric straight and automatic with a 14-in. brake cylinder.

OPERATING CAB OF THE MOTOR CAR

### BOTH PASSENGER AND FREIGHT SERVICE IS MAINTAINED

At the present time two trains daily in each direction are operated, one train in each direction being a passenger train only and one train in each direction a mixed train. The running time of the passenger trains is fifty minutes and the mixed trains sixty minutes. There are three regular stations in the 20 miles, although stops for passengers are made at each mile, on signal. The train crew consists of one engineer and one conductor, who do all of the work necessary to the handling of the mail, express and freight business in addition to the regular work of collecting fares and tickets.

The performance of the motor car in passenger service only, based on operation over track of ordinarily good construction, with the distance between stops as shown and figuring the average duration of stops as thirty seconds, is shown in Table I. This table is based on a motor gearing of a seventeen-tooth pinion

TABLE I—PERFORMANCE OF CAR IN PASSENGER SERVICE

| | Schedule Speed in Miles per Hour | | | | |
|---|---|---|---|---|---|
| Average distance between stops<br>Per Cent Grade | 1 Mile | 2 Miles | 3 Miles | 5 Miles | Free Running Speed |
| Level | 20.5 | 28.0 | 32.0 | 37.0 | 49 0 |
| 0.50 | 19.0 | 25.0 | 28.0 | 31.0 | 41 0 |
| 1.00 | 17.5 | 22.0 | 24 0 | 26.0 | 31 5 |
| 1.50 | 15.5 | 18.0 | 20.0 | 21.0 | 23 5 |
| 2.00 | 13.5 | 15.0 | 16.0 | 17.0 | 18 5 |

STATION AT THIEF RIVER FALLS, MINNESOTA

TABLE II—PERFORMANCE OF CAR IN MIXED PASSENGER AND FREIGHT SERVICE

| Total Train Tonnage | Schedule Speed, Miles per Hour | Schedule Speed No Stops |
|---|---|---|
| 52 | 32.0 | 49.0 |
| 100 | 26.0 | 40.0 |
| 150 | 22.0 | 30.0 |
| 200 | 16.0 | 20.0 |
| 250 | 14.0 | 17.0 |
| 300 | 12.0 | 15.0 |

For periods not to exceed fifteen minutes this car will pull a maximum trailing load of 500 tons.

TABLE III—DATA REGARDING SERVICE AND OPERATING DELAYS OVER A FOUR-YEAR PERIOD

| Year | 1915 | 1916 | 1917 | 1918 | Total |
|---|---|---|---|---|---|
| Days in service | 311 | 318 | 312 | 314 | 1,255 |
| Days out of service (overhaul) | 6 | 0 | 8 | 0 | 14 |
| Car-hours in service | 3,420 | 2,994 | 2,405 | 2,490 | 11 309 |
| Delays due to equipment failure | 3 | 2 | 1 | 1 | 7 |
| Duration of above delays in hours (total) | 4 | 3 | 1 | 2 | 10 |

TABLE IV—OPERATING RESULTS OF THE MINNESOTA NORTHWESTERN

| Year | 1915 | 1916 | 1917 | 1918 | Total |
|---|---|---|---|---|---|
| Motor car-miles | 36,363 | 32,633 | 26,893 | 26,612 | 122,501 |
| Number freight cars hauled | 1,610 | 1,268 | 1,456 | 1,864 | 6,198 |
| Freight-car miles | 27,305 | 21,410 | 24,605 | 31,596 | 104,916 |
| Revenue passengers carried | 36,045 | 31,243 | 29,176 | 26,790 | 123,254 |
| Revenue freight hauled (tons) | 17,416 | 13,608 | 15,470 | 19,864 | 66,358 |
| Fuel consumption (gallons) | 22,970 | 21,832 | 18 033 | 18,756 | 81,591 |
| Lubricants (gallons) | 473 | 356 | 542 | 322 | 1,693 |
| Motor-car miles per gallon of fuel | 1.58 | 1.50 | 1.49 | 1.42 | ...... |

TABLE V—COST OF OPERATING AND MAINTAINING A GASOLINE-ELECTRIC CAR

| Item | Cost Per Year | Cost Per Car-Mile |
|---|---|---|
| Maintenance of car body and trucks | $89.50 | $0.00292 |
| Maintenance of electric equipment | 98.40 | .00321 |
| Maintenance of gas engines | 45.03 | .00147 |
| Other power supplies and expenses | 29.99 | .00098 |
| Fuel for power | 3,386.86 | .11059 |
| Lubricants | 175.26 | .00572 |
| Wages, engineer and trainmen | 2,950.00 | .09632 |
| Carhouse employees and expenses | 1,266.62 | .04130 |
| Total | $8,041.66 | $0.26251 |

and fifty-eight-tooth gear. Higher schedule speeds may be obtained by change of gearing. The speeds given in the table are for average gradients of the amount shown.

Table II shows the performance of the motor car in mixed passenger and freight service, as determined from actual conditions on this line. This table is based on service with stops of five minutes each every 5 miles and for continuous runs of not exceeding 50 miles. Where the runs are longer, stops must be longer, when heavy trains are pulled, in order to prevent overheating of motors and generator. The table is also based on the same gearing as shown in Table I and on level track.

Reliability is one of the prime requisites for railroad operation. The gas-electric motor car possesses this in marked degree. With ordinary care during layover periods, and the chances provided for making minor repairs by the fact that the majority of the branch lines do not operate on Sunday, we have found it is necessary to overhaul this type of equipment only every two years. Table III shows the service rendered during the past four years.

Table IV shows that this type of motor car can be relied upon to handle all of the business (both passenger and freight) that usually is found upon branch lines.

The data shown in Table V on cost of operation are based on gasoline at 17 cents per gallon, lubricating oil at 42 cents per gallon, wages of engineer at $160 per month, wages of conductor at $85 per month and carhouse employees at $75 per month. All of these figures are the average paid by this company during the past four years of operation. The costs given embrace all of the expenses directly chargeable to motor car operation, but do not include any depreciation or interest. The figures are for operation of both passenger and freight service. Where the motor car is used for passenger service only the cost is considerably less. Or if the mileage operated is greater the figures per car-mile are less. This is based on an average of 90 miles per day.

For branch lines of approximately 100 miles, the ideal equipment for economical operation is light-weight motor cars of not exceeding 25 tons, with baggage compartment, capable of seating at least sixty passengers and of making a schedule speed of 35 m.p.h. Such cars would take care of all of the passenger requirements usually met with, especially if the power provided was sufficient to haul one light-weight trailer. These motor cars could be operated at a maximum of 15 cents per train-mile.

For the freight service the ideal equipment would be crude oil locomotives capable of hauling trains of 500 to 800 tons at a speed of 20 to 25 m.p.h. The cost of operating this type of equipment would be less than half of that required for steam operation, as all expenses for fuel, etc., cease as soon as the engine stops. Also they are capable of storing fuel for runs of 250 to 500 miles without replenishing. They need no water or fuel stations along the line.

## Kilowatt-hours in February

The United States Geological Survey has been conducting a census of energy production on returns received from 3150 electric power plants engaged in public service, including central stations, electric railways and certain other plants, the output of which contributes to the public supply. The returns received represent about 85 per cent of the total generating capacity. For plants which did not make returns or which were unable to furnish the data requested, estimates of output were made from available information. The output for the month of February average 110,000,000 kw.-hr. per day, of which 39 per cent was produced by water power.

THOUSANDS OF KILOWATT-HOURS PRODUCED IN FEBRUARY

| State | By Water-Power | By Fuels | State | By Water-Power | By Fuels |
|---|---|---|---|---|---|
| Alabama | 39,372 | 12,939 | Montana | 69,220 | 1,552 |
| Arizona | 3,967 | 16,395 | Nebraska | 810 | 16,022 |
| Arkansas | 77 | 6,275 | Nevada | 2,913 | 137 |
| California | 190,462 | 38,295 | New Hampshire | 4,660 | 2,188 |
| Colorado | 13,161 | 17,271 | New Jersey | 165 | 79,153 |
| Connecticut | 12,419 | 38,643 | New Mexico | 59 | 1,272 |
| Delaware | 0 | 5,549 | New York | 204,590 | 288,986 |
| | | | North Carolina | 43,234 | 2,820 |
| District of Columbia | 0 | 18,094 | North Dakota | 0 | 2,308 |
| Florida | 678 | 11,257 | Ohio | 2,309 | 181,766 |
| Georgia | 35,497 | 7,236 | Oklahoma | 223 | 12,092 |
| Idaho | 42,050 | 259 | Oregon | 27,034 | 3,259 |
| Illinois | 13,701 | 241,930 | Pennsylvania | 55,066 | 243,098 |
| Indiana | 3,761 | 56,151 | Rhode Island | 383 | 28,767 |
| Iowa | 44,214 | 23,110 | South Carolina | 64,745 | 3,235 |
| Kansas | 1,267 | 29,203 | South Dakota | 4,624 | 3,751 |
| Kentucky | 4 | 18,900 | Tennessee | 43,780 | 8,368 |
| Louisiana | 0 | 14,034 | Texas | 165 | 43,151 |
| Maine | 16,611 | 132 | Utah | 48,906 | 0 |
| Maryland | 278 | 18,448 | Vermont | 13,777 | 209 |
| Massachusetts | 19,147 | 102,844 | Virginia | 17,693 | 17,685 |
| Michigan | 49,980 | 97,187 | Washington | 71,160 | 5,667 |
| Minnesota | 24,525 | 28,708 | West Virginia | 1,453 | 51,584 |
| Mississippi | 0 | 5,789 | Wisconsin | 28,284 | 32,709 |
| Missouri | 4,297 | 37,212 | Wyoming | 251 | 3,542 |
| Total | | | | 1,220,972 | 1,879,182 |
| Combined total | | | | | 3,100,154 |

# Electric Locomotives of Moderate Weight and Power

### With Particular Reference to Freight Handling Requirements on Electrified Steam Road Branch Lines and Interurban Electric Railway Lines

By A. B. COLE
Westinghouse Electric & Manufacturing Company

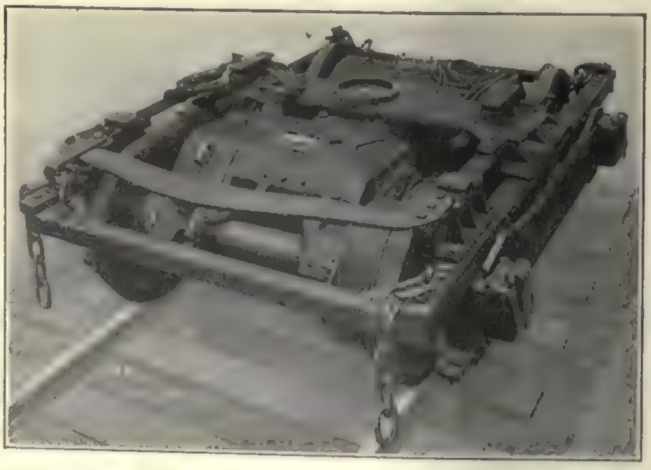
A 50-TON INTERURBAN TYPE LOCOMOTIVE

ELECTRIC locomotives can generally be considered in two groups, regardless of system of current supply, namely, the powerful machines which are used in heavy electrifications on the main lines of important steam roads, and the lighter locomotives which find their field of application in less conspicuous duty in the electrified zones of steam roads and in handling freight cars on interurban lines. The former locomotives are of special designs, each railroad system having its own requirements and its own ideas as to how these are to be met. The design of the lighter machines tends more to standardization.

The purpose of this article is to point out some of the design features of the second type of locomotives and to show what one of the large manufacturers of these machines has developed as a satisfactory arrangement of control and other equipment on the basis of its experience. For convenience these machines will be referred to as interurban locomotives.

## Some General Characteristics of the Locomotives Under Discussion

Standard interurban freight locomotives are usually of the "steeple" type. To many this is preferable to the box type in appearance, and it is free from compressor noise. The cab proper is built of steel with rolled steel channels for the underframe. A hardwood floor is provided in the cab, and a checker-plate walking platform is used outside the cab. All-metal bumpers are used and the splintering so often found in wood bumpers with steel plates is thus avoided. M. C. B. couplers mounted in bumper pocket castings are standard, but where trailing loads must be hauled around short-radius curves, these couplers may be mounted on radial drawbars. Friction draft gear, or spring draft gear can be used to meet severe conditions. When the weight of a given type of locomotive of a sufficient electrical capacity is less than the weight required from the standpoint of adhesion, additional weight is provided, principally in strengthening the various members rather than loading with ballast. The trucks are of the rigid bolster equalized pedestal type. This type of truck has a minimum number of wearing parts and no projecting springs and provides a substantial means of transmitting the high tractive efforts required in freight service. The various members of the trucks are held together by tapered bolts in reamed holes. Swivel trucks with brakes actuated through a radius bar are standard, due to the ease with which they negotiate short-radius curves.



TRUCK OF INTERURBAN FREIGHT LOCOMOTIVE WITH MOTORS MOUNTED

## Reliability Is the Prime Consideration

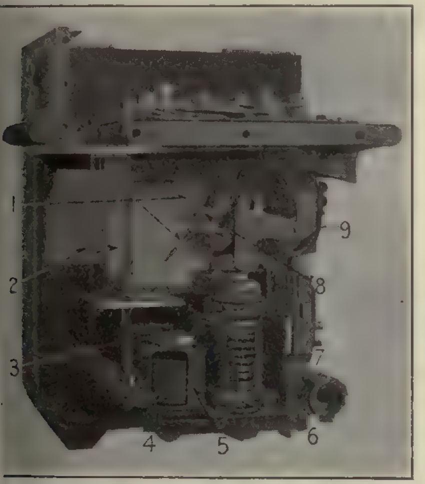
Two of the most important factors to be considered in handling freight are reliable operation of equipment and continuity of service. The first is of prime importance in that on many roads there are but one or two electric locomotives and these must be available for service at all times, irrespective of the fact that they must be kept in operation as much of the time as possible.

In designing a locomotive equipment five essential features must be considered: (1) The weight, type, capacity and mechanical design should be suitable for the service requirements. (2) The motive power apparatus should be selected to meet the service conditions. (3) The apparatus on the locomotive should be mounted in such a way that each part will be permitted to operate to the best advantage, with the chance of trouble reduced to a minimum. (4) All apparatus should be accessible for inspection, maintenance and overhauling. (5) There should be no danger of the operator being thrown in contact with the live parts.

Centralization of control equipment is very important and one arrangement of this is shown herewith. This has a number of advantages, some of which are summed up briefly as follows:

In the first place, all control apparatus is assembled ompactly in one part of the locomotive, and the switch groups are located in such a manner that they are eadily accessible from all sides and at such a height hat a man can get at them freely.

Another feature is the location of grid resistors above he switch groups which are placed under the roof, educing the length of connections between these two ieces of apparatus to a minimum. All heat from esistors passes directly through the roof ventilators nd practically none reaches the switch groups. The eversers and series parallel switches also are readily ccessible, and at the same time are centrally located elative to the propelling motors, thus requiring a minimum amount of cable. Again, the air-brake distributing valve is located inside the cab, protected against freezing and easily accessible. Objectionable noise and drafts inside the cab are eliminated by placing the compressors and blower motor in the hoods, which location makes it easy to lift them out by merely taking the hoods without disturbing any other apparatus. nally, all control parts are visible and at the same me protected from accidental contact by grounded panded metal screens which are made up in sufficiently all sections to permit ready removal for inspection of paratus.



DETAILS OF UNIT SWITCH
1, Arcing horns; 2, arc chute; 3, magnet lve stem; 4, air valve; 5, operating gnet; 6, air cylinder; 7, operating ring; 8, contact tips; 9, contact shunt.

## RUGGEDNESS OF EQUIPMENT IS AN ELEMENT IN RELIABILITY

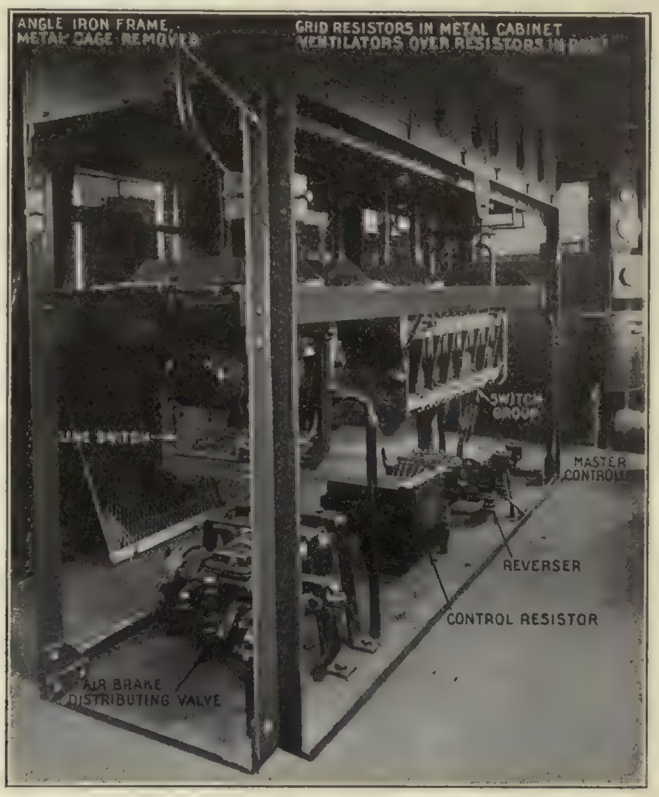
The demands of freight service require motive power ipment of rugged construction, and in locomotives moderate size the features that have proved sucsful in city and interurban cars have been incorrated. The motor characteristics, however, had to be nged to furnish low-speed freight service at good ciency, hence a low-speed locomotive motor was ught out. This produces high tractive effort at low ver demand (the locomotive speed being low), making sible the hauling of freight on roads of limited subtion and feeder capacity.

esign features introduced to insure reliability and lo maintenance cost include particularly the following: ( Form-wound armature coils, with special insulation inthe ends of the slots. (2) Strap-wound field coils urely fastened and held against vibration. (3) Substantial brush-holder design and construction. (4) Mica insulated, undercut commutators. (5) Bearings of ample size with oil-gaging pockets, lubricated by oil drawn up and filtered through waste. (6) Two-point gear case suspension.

## UNIT SWITCH PLAN SOLVES THE CONTROL PROBLEM

The unit switch control is used on locomotives, the Westinghouse Company having adopted the air-operated, "HL" type for this purpose. This has proved itself capable of handling the heavy currents encountered and also to withstand the bumps to which the locomotives are subjected, particularly in switching work, low-speed drag-freight service or main-line service.

The designers of this control have had in mind the following requirements: (1) Ample protection against too heavy overloads, grounds, short-circuits, surges in the contact line and lightning. (2) Simplicity of apparatus and circuits. (3) Powerful forces at the contacts. (4) Contact pressure independent of line voltage. (5) Small number of wearing parts. (6) Ease with which contacts and arc chutes may be renewed. (7) Small number of simple, rugged interlocks. (8) Ease of operation of two or more locomotives from the same master controller.


ANGLE IRON FRAME, METAL CAGE REMOVED
GRID RESISTORS IN METAL CABINET
VENTILATORS OVER RESISTORS IN
SWITCH GROUP
MASTER CONTROL
REVERSER
CONTROL RESISTOR
AIR BRAKE DISTRIBUTING VALVE

CONTROL EQUIPMENT AFTER REMOVAL OF SCREEN

In this control the various main circuit connections are made by unit switches, actuated by compressed air taken from the air-brake system; the admission of air to the switch cylinders being controlled by magnet valves. These magnet valves are operated by current from a control circuit through a train line from the master controller. Current from this control circuit is tapped from points on the control resistor which is connected between trolley and ground, or may be supplied by a storage battery. One of the illustrations shows a cross-section of an HL-control switch group.

Some of the distinguishing features of the construction of the switch group are brought out by the numbered arrows on the illustration of the unit switch reproduced on page 1153, as follows:

(1) Bronze arcing tips carry the arc out from the butt contacts under the impetus of a magnetic blowout flux. The arc traveling outward on the tips is cooled so that little burning takes place. (2) Reversible asbestos lumber arc chute sides, removable by pressing aside a small spring retainer, confine the arc to limited space. (3) Pins which when depressed admit air to the cylinder and operate the switch mechanism, permit inspectors to test the movement of each switch without any current on the locomotive. (4) The valve mechanism, under the action of an electromagnet energized from the master controller, permits the entrance or exit of the compressed air which operates the switch. (5) The valve actuating magnets are inclosed within weatherproof cast-iron shells. The coils are impregnated with "bakelite." (6) The piston, which forces the movable contact upward is made of triple-ply treated leathers reinforced with metal expanders. (7) The heavy coiled spring exerts 100 lb. pressure against the piston. Upon release of air from the cylinder the switch jaws are quickly separated. (8) Heavy copper butt contacts comprise the switch jaws. They are self-cleaning by virtue of a "wiping" action which takes place during opening or closing of the switch. Their current carrying capacity is made positive by the contact pressure secured by the use of compressed air. (9) Heavy flexible shunts of braided copper relieve all bearings and pins of duty.

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# Methods Used in Third-Rail Bonding

## High Conductivity Is the First Essential, and Ease of Installation and Maintenance Are Important Consideraitons

By G. H. McKELWAY
Engineer of Distribution, Brooklyn Rapid Transit System

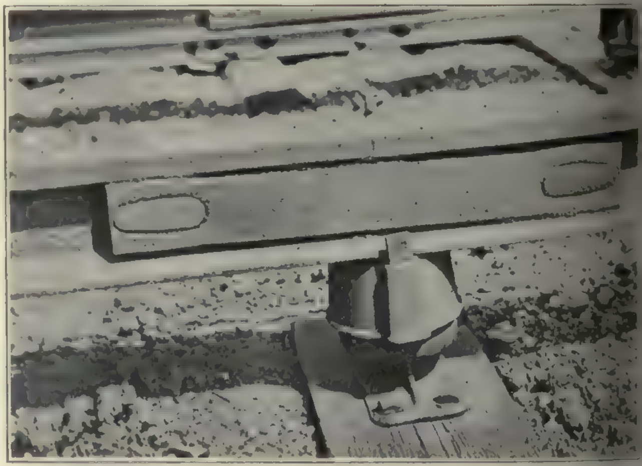
THE methods used in the bonding of conductor rails of third-rail systems are similar in many respects to those used in bonding running rails, but they are generally simpler. The reason for this is that the third rail is considered solely in regard to its use as a conductor of electricity while the running rails have a double function to perform. The carrying of current by them is the less important function, always subordinated to their use as part of the track over which the cars must operate. The running rails themselves and the joint plates connecting them must first be considered from a mechanical standpoint and designed to withstand the stresses to be imposed upon them by the rolling stock. The bonding must be installed so as not to weaken the rails or joints, or in any way to interfere with maintenance or repair.

The conductor rails, on the other hand, are not exposed to the loads which the track rails must continually support and the blows which they must receive. The joints can thus be designed to give ample clearance for the bonds, with only so much of strength as is needed to withstand the comparatively light wear and the light blows from the third-rail shoes.

At first the usual practice was to install, as third rail, old running rail that had outlived its usefulness in the track but which answered quite well as a heavy conductor. If a rail heavier than the light track rails was wanted, or one on which there would not be so much maintenance as on the old rails, new ones were bought, but nearly always they were of the same section and composition as those used in the tracks.

### PREVIOUS TYPE OF BONDING USED WITH OLD RUNNING RAILS

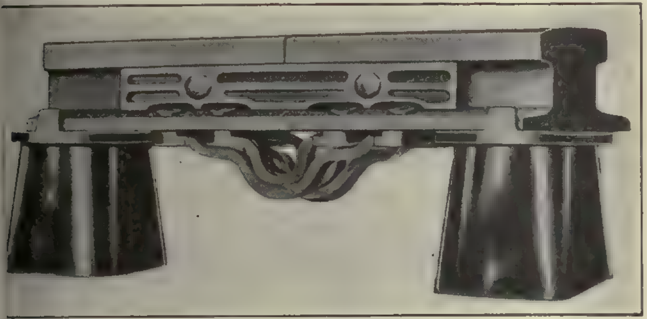
With such rails it was only natural that the old type of joint plates should be used and that the rail, when set up on insulators at the side of the track, should be bonded in the same manner as was done when it was part of the track. As the bonding most generally used with T-rail is the expanded-terminal type, either under or around the joint plate, that type wa usually used when the old track rail was used for the third rail. In nearly all cases the old bond holes were used for the new bonds which were installed in the usual manner.



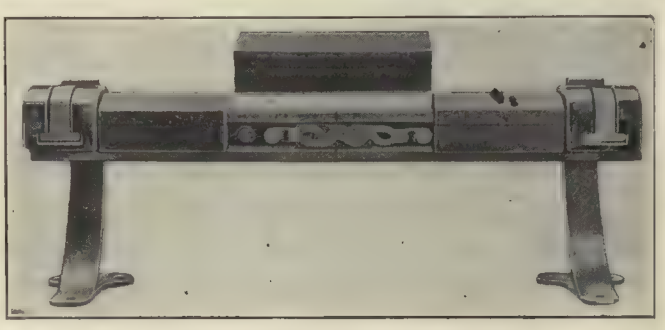
WELD ON THIRD RAIL JOINT

While protected bonds compressed into the web of the rail made a very satisfactory job and one that would last for a very long time if the bonds had been we installed, yet, as the bonds were placed under the plates, their condition could not be told by inspection alone and repairs to defective bonds were rendered more difficult and expensive than would have been the case if the bonds had been exposed. Furthermore, there was almost no reason for putting the bond under the plate, except that by so doing a shorter bond could be used than if it had been installed around the joint, as the iability of persons stealing the bonds from live third ail is very very slight.

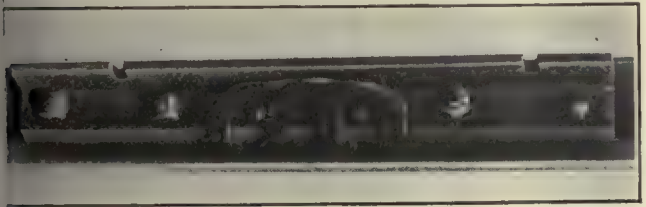
But the installation of bonds outside of the plates nd compressed into the web of the rail required the se of bonds that are quite long and, therefore, both xpensive and inefficient, hence attempts were made to se either the head or base of the rail as the place or installing the bonds. Bonds so installed have roved very satisfactory and have been widely used, specially on roads where the third rail is made of a oft steel of special composition and section. The thick vebs of such rails necessitate the use of bonds with ery long terminal studs if the studs are to go entirely hrough the web of the rail. Such bonds have been sed, even when the web of the rail has been as thick s 2¾ in., but the more usual practice has been to se other types of bonds en where rails with thin- er, but still comparatively ick, webs are placed on e insulators. The appli- tion of bonds to the base the third rail was tried t comparatively early d that location has been favorite one for the in- allation ever since. The lice bars may be merely t plates bolted up tight against the webs of the rails, there is no necessity for supporting the head as uld be the case with a running rail. This arrangement leaves plenty of room on the base of the rail tside of the plates into which the foot bonds can be mpressed and where they neither interfere or are erfered with, by the splice bars. If for any reason is desired to use the ordinary type of angle bar etending down over the base of the rail, sufficient rtions of them can be cut away at the points where e bond terminals will come to permit of the easy installation of the latter.



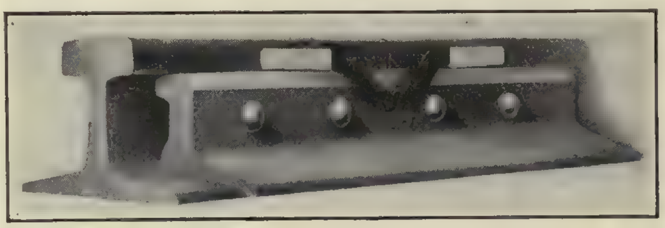
FOOT BONDS USED IN PENNSYLVANIA RAILROAD TUNNELS



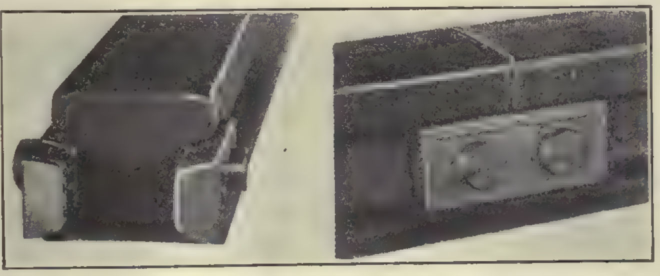
PROTECTED TYPE BOND APPLIED TO DOUBLE HEAD PROTECTED THIRD RAIL



OLDERED TYPE OF RIBBON BOND FOR HEAD OF RAIL



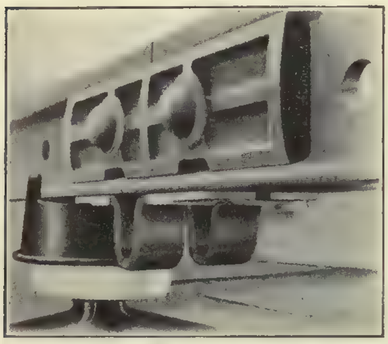
TWIN TERMINAL BONDS ON HEAD OF RAIL



BOLTED AND SOLDERED SPLICE BARS

Another type of foot bond, with which angle bars can be used and the installation of which will not necessitate any cutting, is one composed of flexible copper ribbons formed into a U-shaped loop and soldered under the base of the rail. By the use of this the rail can be heavily bonded and it will be unnecessary to install more than one or two of these bonds. If well put on, the bonds will "stay put" much better than soldered bonds placed at any other point on the rail and will give satisfactory service. The bonds, however, cannot be put on to advantage after the rail has been placed on the insulators so they must be installed while the rail is turned over on its side or head and after the joints have been bolted up. Then a long section of the rail is set in place at one time. It is obviously impossible to renew bonds of this type satisfactorily after the rail has been placed in commission. On the head of the rail the bonds are installed by either riveting, soldering or welding. The twin-terminal bond has been used to a large extent for this work. This bond, as shown in an accompanying illustration, consists of two short loops of stranded wire having at their ends terminals at right angles to the loops made by the wire and lying against the head of the rail. From each of these terminals two studs project. The bond is applied by first drilling two holes into each end of the abutting rails at the proper distance apart, the holes being ⅜ in. deep and ½ in. in diameter. An annular groove is cut near the top of each of the holes by a swinging milling cutter rotated in the hole. Then the studs are inserted and driven in with a hammer, the soft copper of the studs flowing into the rings and holding the terminals firmly in place.

The soldered bonds are generally made up of ribbons of copper instead of wire, and are soldered to the head of the rail with the loop either hanging down or projecting horizontally. Bonds soldered to the head of the rail have, however, been given up by nearly all railways as they are too easily knocked off, either by thieves or by something hanging from the car above and dragging along the head of the rail. Again, soldered bonds, although they may seem to be firmly connected to the rail at the time that they are installed, very often loosen up under vibration and then one or both ends of the bond comes away from the rail. The welded bonds are made of either ribbons or wires, and the finished job appears much like a soldered bond but the terminals are held to the rail by bracing or welding instead of soldering. They are put on in any one of three ways. In one plan, a car on which has been mounted a single-phase rotary converter or alternating-current generator, together with a transformer, is brought to the job and the bond is clamped tightly against the rail while both the rail and the bond are heated by the current flowing from the apparatus on the car through the clamp and bond into the rail. They are then brazed together, the operator holding a strip of brass and melting it down at the bond terminal. If electric current can be obtained the rotary converter is nearly always used, but if it is not available the current is obtained from the small generator driven by a gasoline engine.

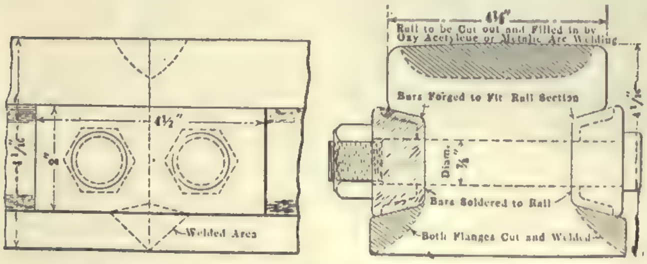


SOLDERED TYPE OF FOOT BOND

### NORMAL POWER SUPPLY CAN BE USED BY INSERTING RESISTANCE IN THE CIRCUIT

Another plan, which can only be used when current is available, is to reduce the voltage by the use of resistance in the circuit. The bond and rail are then heated by an electric arc and the molten welding material, either copper or iron, is flowed around and under the terminal, welding it to the rail.

In the third plan, the heat applied is received from an oxy-hydrogen, oxy-acetylene, or similar flame and the bond is attached to the rail in the same manner as is done when the electric arc is used.


4½"
1 1/16"
2"
Welded Area
4½"
Rail to be Cut out and Filled in by Oxy Acetylene or Metalic Arc Welding
Bars Forged to Fit Rail Section
4 1/16"
Diam. ⅞"
Bars Soldered to Rail
Both Flanges Cut and Welded

DETAILS OF THIRD RAIL WELDS AND BOND

Carrying still farther the idea that the third rail should be treated as a conductor and not like the running rails, a few companies have combined the bond and splice plate into one piece by welding the ends of the rails together or by some other method by which a single short piece of metal on each side of the web of the rail will do duty both as bond and splice bar.

There have been attempts to do away with the use of bonds by merely bolting the plates up tightly to the rails and depending upon them to carry the current. This, however, has proven even more of a failure when tried with third rail than with the running rails. The reason for trying it with third rails has generally been that the work has been of only a temporary nature and it was believed that the bolts in the third rail joints would remain tight much longer than those in the track. The results, however, have always proved that rust will work in between the rails and the plates, making a high resistance joint, and that the bolts will soon become badly burned.

The ordinary welded joint, similar to the welded joints in the tracks, has been used and has given great satisfaction, the only objections being the high first cost and the difficulty of opening the joints later if that should be necessary on account of an accident, when it may be desired to have the rail alive up to the wreck so as to permit bringing up the wrecker, but to have it dead at the point of trouble so that the men can work without danger. Another objection, when the welding is done according to the scheme largely used on track rails, is the cumbersome train of welding cars needed and the inability later to use that type of joint in scattered work as the cars are owned by an outside company and are therefore in the section where they might be wanted only occasionally. Then it would be necessary to route the traffic around the cars while they work, as they occupy the track on which they work. Again, unless the third rail should be very low and close to the running rail, it would be impossible to weld the joints in place, the usual plan being to weld long sections at one time while the rail is on the ground and later to place it on the insulators.

Thermit joints can be made with the rail in place on the insulators and scattered joints can be welded by that method without the interference to traffic necessitated when cars are used. The price of the completed joint is, however, quite high and that is the principal reason why it has not been used more extensively.

Still another welded joint which has been brought to a high standard of perfection is one where the plates are used and are not only bolted up but their two edges are seam-welded to the rail by means of an electric arc and then the abutting ends of the rails are joined together by means of molten tin poured into the opening between them.

One other method of obtaining joints of high conductivity and current carrying capacity, yet of not too high first cost, has been by the casting of a short heavy copper bond connecting the ends of the rail, a mold being placed on each side of the joint and the molten copper being poured in as with the ordinary cast weld. When the copper has cooled the excess is cut away, leaving a very short joint of high conductivity. This joint must be very carefully made or there will be trouble on account of its breaking as a result of vibration or the expansion and contraction of the rails.

Still another joint which has given good satisfaction is made by bolting and soldering a short piece of copper to each side of the joint, only one bolt passing through the end of each rail. These bolts are made of special steel so as to give sufficient strength to withstand the pull of contraction that may be placed upon them and in addition a portion of the top of the head of each rail is cut away at the end and then the ends of the rails welded together by this space being filled in with molten metal deposited by arc welding. This not only strengthens the joint but adds to its conductance.

# Solving the Traction Problem*

### Electric Railways Are Faced with Permanently High Operating Costs and Aid Through Increased Receipts Is Urgently Needed

BY THOMAS CONWAY, JR.
Professor of Finance, University of Pennsylvania

WHILE a considerable proportion of the electric railways in this country have secured some reief, yet many properties have been unable to increase evenues sufficiently to offset the largely increased cost f operation. Various reasons have been cited for the ailure to secure relief in such cases. In some states, s for example, in New York, the courts have denied o the commission power to increase rates beyond the axima specified in the franchises. In a very few tates, the public service commissions do not exercise risdiction over electric railways. Under both condiions the appeal for relief, therefore, must be directed o the city authorities.

I know that you will all agree with me that the verage city official does not possess the technical aining necessary to enable him quickly to analyze nd weigh the merits of such an appeal, nor do the ties have an organized staff of trained experts, engieers and accountants versed in the intricacies of traffic, gineering and accounting matters, on whose analyses e city authorities can reply. Therefore a longer riod of time has been required to secure a proper justment of fares in those cases in which the city self had to decide upon the merits of the case.

There has been, moreover, a feeling of distrust in rtain quarters concerning the genuineness of the ed of the electric railways for relief, and much consion of mind has arisen as to the proper course be pursued in granting such relief where the necesty therefor was established. In such cases, the comnies have suffered because of the delay which has curred, but the disadvantages have been almost as eat to the patrons of the electric railways and to the nicipalities in which they operate. Many persons ve felt that good progress could be made in the wise ution of the question by the appointment of some ard or commission whose membership would be such to command the confidence of the public at large, to ich would be delegated the task of making an instigation of the general status of the industry and ggesting the way in which needed relief should be anted.

t is the announced intention of the Federal Elecc Railways Commission, just appointed by President lson to avoid passing upon local questions; that is say, attempting to adjudicate the merits of any parular application for an increase in fares. It is the ention of the commission, as I understand it, to ke a general study of the position of the industry l a critical analysis of the various methods of ref which may be suggested, the purpose being to place the disposal of state and local authorities a fund information upon which they can act intelligently solving particular problems.

Jnder present conditions, the solution of the electric lway problem can be accomplished by a possible comation of two methods. The first involves a decrease expenditures, the possibilities of which are comparatively limited. Wherever inefficient operation prevails, the cities should insist that the companies adopt the most approved methods of operation, or at least that the loss occasioned by inefficient methods be borne by the railway and not passed along to the car rider as a part of an increase in fares. The greatest opportunity for decreased expenditures lies in a reduction of state and municipal taxation, the elimination of local paving requirements, and other relief of a similar nature. Unfortunately, many municipalities do not feel that they can, at this time, spare the revenue heretofore derived from the taxation of railways or assume the paving burdens which have been placed upon these corporations. Municipalities, like the electric railways themselves, find that the cost of doing business has largely increased, with the result that the cities are casting about for a way to secure larger revenues rather than to reduce the sources from which revenues have been heretofore derived.

From the standpoint of the equities of the case, no good reason can be advanced why the car rider should be required to pay higher fares in order to maintain street paving which he in no way wears out while taking his car journey. The tremendous increase in the use of the automobile, especially the growing number and size of auto trucks, has brought about very rapid deterioration in street pavements and has required a much more expensive type of pavement than has heretofore been deemed necessary. Under present conditions, there is no reason why the railways should be required to maintain pavement, except in so far as they themselves destroy the pavement while making repairs to their tracks. The paving burden should in equity, be shifted to the shoulders of those who use and wear out the pavements. The registration fees required of both passenger and commercial automobiles are very moderate, and I believe a much fairer solution of the problem could be secured by passing the burden of maintaining road pavements of all kinds along to the owners of automobiles and other vehicles, the tax being graded in proportion to the destructive effect of the various classes of cars.

## OPERATING COSTS WILL NOT DECLINE

One of the important functions which the new national commission can perform will be to inform the public at large of the continuing character of the electric railway cost problem. In so far as the next few years are concerned, there is no prospect of a material reduction. The cost of labor will tend to increase rather than diminish. It is true that a decline has occurred in some places in the rates paid common labor, but offsetting this are the demands for higher wages and shorter hours of the organized skilled and semi-skilled labor, of which the most important class is the trainmen. There are now pending before the National War Labor Board a large number of cases in which the employees are seeking higher wages than heretofore allowed by the board. Employees of the Detroit, Pittsburgh, Public Service, Bay State and numerous other companies are now asking for higher wages and shorter hours.

The outcome of these demands is, of course, uncertain, but it should be remembered that the electric railway industry is face to face with a world-wide demand for an eight-hour day. The granting of this demand would mean a very material increase in operating costs, because of the peculiar conditions surrounding the electric railway business. Unlike other businesses, it is impossible to offset the reduction in the working day by a speeding-up process. The motorman and conductor cannot increase their productive power in this fashion, for the speed of the car is determined by practical considerations, such as matters of safety and the convenience of the public. To what extent the labor cost will increase is problematical, but in view of all of the factors which are involved, I am certain that there is no prospect of any material reduction in labor costs.

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*bstract of address before the New York State Conference of ors at Schenectady, N. Y., June 11, 1919.

With no chance for a reduction in two-thirds to three-quarters of the operating expenses representing payments to labor, the possibilities for economies are therefore largely reduced. What is the situation concerning material costs? It is probable that with the passage of time, some reduction will occur in the prices of steel rails, copper wire, motor parts and the thousands of other articles purchased by electric railways, but so long as the labor costs in the industries producing these articles remain high, it is impossible to expect a reduction in the prices of these commodities to anything approaching pre-war levels. The electric railways are face to face with the necessity of permanently paying high prices for materials and supplies.

Moreover, in so far as the total operating expenses are concerned, any possible reduction in the cost of the various materials purchased will be more than offset by the larger quantities which must be purchased. In response to a national policy, the electric railways, like other industries, confined their expenditures for the repair and renewal of track and other portions of their properties to a minimum during the war period. But this policy cannot be indefinitely continued. Indeed, the industry at this moment is face to face with the necessity for very large expenditures to make up, by degrees, for the failure to do a normal amount of work during the war. The cost of a normal amount of renewals and replacements is materially larger than the expenditures for such purposes made during 1918. When the increased expenditures for renewals are carried into the results for the year, it will be found, in practically every case, that the total expenses of the electric railways are materially greater than they have ever been in any preceding twelve months period.

### THE SO-CALLED "EMERGENCY" IS A PERMANENT CONDITION

The "emergency," as it is termed by the public, has therefore not passed and will probably never pass, in the sense in which the term is used by the average man. The cost of operation of the electric railway has been permanently placed upon a higher level, and it is idle to evade the consequences which are entailed. To meet largely increased expenses requires materially increased revenues, and this is true no matter who owns the electric railway or who operates it. The service-at-cost plan does not enable the community to escape the necessity for meeting increased expenses.

If the municipalities themselves owned and operated the electric railways, sound business policy would demand that revenues be increased sufficiently to meet increased expenses. It is now a well settled policy of municipal finance that water works should be made self-supporting and, indeed, there is no rational stopping place under municipal operation between service without charge, as in the case of sewers, and service at what it costs the city. The sooner we realize that no matter what form the solution may take, it must be placed upon the firm foundation of collecting sufficient revenue to defray the cost of service, the more quickly can we take up the question as to exactly what form the solution should take.

There is no doubt that certain companies have been heavily over-capitalized in past years and that men have gotten rich by putting together consolidations and selling securities to the public aggregating much in excess of the fair value of the properties. I stand here to hold no brief for such financial methods. They were iniquitous and have resulted in irreparable damage to the industry as a whole. I do not believe, however, that, taking the electric railways as a group, there has been anything like the overcapitalization which the public at large has been taught to believe exists.

The first step in the solution of the present problem is a frank understanding by both the companies and the public of the necessity for the determination of fair value, in order that the public may know whether the return which they are asked to pay to bond and stockholders is more than a reasonable return. If the public and the company are both agreed that no more should be asked or allowed than a fair return upon the fair value of the property, the matter of capitalization becomes of minor importance, and it is then possible to demonstrate to the people of any city that it is to their selfish interest to see that this return is paid, rather than to grind the railway ino bankruptcy by insistence upon a franchise stipulation concerning fares.

### ONLY ALTERNATIVE IS INCREASED FARES

If it is granted that the companies are entitled to increased revenue sufficient to offset increased operating expenses and taxes, the problem of how this increase is to be secured arises for solution. The necessity is so great that the only alternative in most cases is an increase in fares. The evidence at hand shows clearly that increased fares do not bring a mathematically equivalent increase in revenue. Increased fares discourage short-distance travel and to some extent decrease the volume of long-haul business. The average man believes that the electric railway enjoys a complete monopoly, and indeed the theory of our law sustains this belief; but as a practical matter, the electric railway in most cities does not by any means enjoy a complete monopoly. In the smaller cities, an increase in fares beyond a certain point will defeat the desired end by driving people to the sidewalks. In the smaller cities, one may walk from the business center to any residential district in twenty minutes or one-half hour. Higher fares encourage the walking habit, on the part both of those taking short journeys in the business district and of those traveling between their places of employment and their homes.

The electric railway, moreover, encounters a most serious competitor in the automobile. The people of New York are to be congratulated upon the good sense which was displayed by their Legislature and commissions in outlawing the unfair competition by jitneys. The privately owned automobile, however, has exercised a most serious effect upon the electric railway business. In 1914, 1,574,431 pleasure cars were licensed for operation in the United States. In 1918 the number of pleasure cars licensed was 5,352,350. It is hard to believe that such an enormous increase in the use of the automobile could have occurred in such a short period. The automobile has not only decreased riding upon the trolley cars during business hours, but it has deprived the railway of practically all of its pleasure riding. The entire economic basis of the industry has been undermined, and it requires no prophet to see that if the business is to survive it must be a radically different business ten years from today than it is at the present time. It must, in the first place, secure prompt and adequate relief by a sufficient increase in revenues to enable it to function as a public utility; for a rejuvenation of credit is essential to carrying through the radical readjustment in operating methods which, in my opinion, will be necessary. In many of our smaller cities, the companies must turn to one-man cars, permitting more frequent service with reduced operating costs.

In our larger cities, I believe the time has come when the companies and the public must face the necessity of abandoning the theory of a flat 5-cent fare covering the entire city area, and of charging the passenger according to the distance which he rides. It is inequitable and, as a business matter, unjustifiable to expect the short rider to pay 7, 8, 9 or 10-cent fares in order to defray part of the cost of carrying the long distance rider. The next few years will witness important experiments in the attempt to base fares upon the service rendered, charging the short distance rider a fare not in excess of 5 cents and providing increments above that amount as the length of the journey increases.

The solution of business questions of a public nature is the acid test of a democracy. I believe every fair-minded municipal official will agree with me that nothing is to be gained by dodging the solution of the traction problem. Every day of delay makes the solution more difficult. I think the American public is convinced, especially in view of recent experience with federal operation of railroads and telephone and telegraph lines, that greater efficiency is to be secured under private operation. Exceedingly few of our municipalities are in a position to finance the purchase of their electric railway systems, and, as a prominent municipal official of New York City has recently put it, "it would be bad policy to buy a losing business." If private operation is the most satisfactory, and the municipalities are not in a position to purchase their electric railways and lease them to private operators (the advantages of which are very debatable), then the only course which remains is to make it possible for the present owners to give good service and to meet the demands of the community, which entails a just and reasonable increase in revenue sufficient to offset the increased cost of service.

There is no more important question before the municipal officials of the State of New York than the solution of the electric railway problem. It is to be hoped that the question will be dealt with in a broad-gaged spirit by both sides, for the electric railway is a necessity of city life, and as such deserves unbiased and enlightened treatment on the part of those who have it in their power to grant such relief as may be necessary under the circumstances of each case.

## Vacation Days Among the Pines

NOT many electric railways in the United States are able to provide such a vacation camp for employees as the Pacific Electric Railway has done in California, but this company's example may encourage others to do the best they can with the natural means at their disposal.

The Pacific Electric Railway "Vacation Home," which last year entertained more than 800 employees and their families for varying periods, is on a wooded 15-acre tract in the San Bernardino Mountains, 22 miles from San Bernardino and 1½ miles from Little Bear Lake. The principal buildings are the Social Hall and the delicatessen store, with lunch counter. There is also a fine swimming pool, 30 ft. x 60 ft.

The residents are housed in tent cottages, 9 ft. x 12 ft., furnished with bed and springs, mattress, washstand, bowl, pitcher, mirror and chairs. Each tent has a kitchen equipped with an oil stove and other necessary housekeeping equipment. Where employees have their own camp outfits, space for camping is furnished free.

Upon the basis of present food prices it is calculated that supplies for a family of two cost $8 to $12 a week and for a family of four $15 to $18 a week. The tent cost for single persons, who must combine in groups, is $2.50 apiece a week, and for a family of two or more (all dependent except the head) the cost is $3.50 a week. Non-dependent relatives or friends may be included if spare equipment happens to be available at the time of arrival. The company furnishes free round-trip transportation to employees and their dependents from any point, and the San Bernardino Mountain Auto Line gives reduced rates to these.

Two weeks is the maximum stay permitted unless the camper has his own outfit. Camp periods begin and end with Sunday. Reservations cannot be made for split weeks. The season begins on June 15 and extends to Sept. 15.

HOW THE PACIFIC ELECTRIC RAILWAY MAKES VACATION PLEASANT FOR ITS EMPLOYEES

# Philip Dawson on Future Electrification

## Ministry of Ways and Communications Will Temporarily Retard But Eventually Accelerate Electrifica tion on a Large Scale—Plans Made by Individual Railways Would Be Altered in Some Particulars—A Wider Choice of Systems Now Possible—Success of the Brighton Electrification Leads to More Ambitious Plans for Early Development

PHILIP DAWSON needs no introduction to the American electric railway engineer nor to other readers of the ELECTRIC RAILWAY JOURNAL. In his early days, Dawson's "Electric Traction" quickly became the handbook of the street and interurban railway.

In the last decade, Mr. Dawson has achieved fame through his pioneer work in heavy electrification, notably that of the London, Brighton & South Coast Railway's suburban lines. Full of irrepressible vim and energy, he is the type of man whose interest in life extends far beyond the field of his profession. Consequently, it is not astonishing to learn that he has recently been elected on the municipal reform ticket to represent West Lewisham on the London County Council; nor that he was promptly made a member of the highways and electric supply committees. The function of the latter is explained by its title, but the scope of the highways committee work includes not merely highways, bridges and ferries, but also the large tramway system operated by the London County Council. As election to the council brings no salary, it is obvious that the L. C. C. stands to get some high-class engineering for nothing.

Mr. Dawson is also a member of the commission appointed by the Belgian government during the war to investigate the future of Belgian State Railways, rendering valuable service for which the King of the Belgians has created him Chevalier de l'Ordre de Leopold.

Since the Belgian government has returned to its capital, Brussels, a very important commission has been created by the Belgian Minister of Railways under royal decree, to report to the government on the advisability or otherwise of electrifying a portion or the whole of the railways and to investigate and report on the problem of co-ordinating the electric power generation and distribution of the country.

The commission comprises all the heads of departments of the Belgian State Railways and the post and telegraph service, the professors of electrical engineering of the Belgian universities, and a number of representative business men, manufacturers and bankers nominated by the Crown, as well as the electrical and mechanical engineers of the French State Railways, the Chemins de fer du Midi and the Chemins de fer d'Orleans. Mr. Dawson has been appointed one of the two vice-presidents of the commission, which is presided over by Baron Ancion, a well-known Belgian senator, who is connected with large coal, iron and steel and banking interests.

PHILIP DAWSON

Mr. Dawson is also a member of the committee set up in England by Sir Albert Stanley, president of the Board of Trade, to investigate the water-power resources of the United Kingdom, having been appointed to this position by the president.

The accompanying portrait of Mr. Dawson shows him in another and more readily recognized form of patriotism, namely, as a military man. Although his fifty-two years barred acceptance of his services in the field, he promptly offered his services as a volunteer and became major in command of the Third Volunteer Battalion, Royal West Kents.

In discussing electrification possibilities with Mr. Dawson it was natural to ask him first what the effect, favorable or otherwise, would be of the formation of a Ministry of Ways and Communications as proposed with such far-reach powers of co-ordination. He replied that in principle this would be an excellent thing for the advancement of electrification. To be sure it might retard the early electrification of certain individual systems, but in the long run it would accelerate electrification. What he feared was that electrical enthusiasts would lead the public to expect too much of electricity. People were already talking about a farthing a unit (½ cent per kilowatt-hour) for electric energy for lighting, power and heating, and of main-line electrification over night. The old dangerous magic associated with that mysterious "electricity" threatened to come into action again.

As a man of business, as well as an electrical engineer, Mr. Dawson said that he had only one test to propound concerning electrification, and that was "Will it pay?" Countries like Ital Sweden, Norway and Switzerland wer undoubtedly right in considering th electrification of practically all the lines, because they have no coal c their own but have plenty of wate power. In such cases strategic reason and national economies were rulin factors. Great Britain, however, coul look at the problem of electrificatio in a different light. It has plenty c coal and little water power. Electrif cation, therefore, is chiefly a propos tion of getting back the interest on th investment. Subjected to this test i would be found that immediate electr fication of the majority of long mai lines would be unprofitable. On th other hand, there were ample reason for the electrification of such district as Birmingham, Manchester, Liverpoo Glasgow and Newcastle, and certai heavy freight lines.

The territory served by the Brighto Railway is especially suited for one o the auxiliary advantages or by-product of electrification, namely, the sale o power to industries along the line. I Great Britain there is much talk of universal development of power suppl for the so-called cottage and agricul tural (particularly dairying) industries but there is also the possibility of serv ing other members of the populatio within short tapping distance of th railway's right-of-way. As a transmis sion line would have to be put up i any event, the railway is in a positio to supply current cheaper than if inde pendent supply lines were built.

### GREAT INCREASE IN CAPACITY OF ELEC TRIFIED BRIGHTON TERMINAL

In discussing the results of the Bright on electrification completed under hi direction, Mr. Dawson said that electri motor-car operation had already permitted the Victoria Terminal in Londo to handle 150 per cent more traffic tha before, and another 150 per cent coul be borne with ease. Since the electrification in 1909 a still more significan phenomenon showing the value of electrifying suburban lines has occurred This was the increase in suburba traffic. The number of single-ticket riders has more than doubled and, wha is still better, the number of seas ticket riders (commuters) has near quadrupled. He felt confident that the electrification to Brighton, Worthing and Eastbourne which is being clamored for by the population would be equally successful. It must be remembered, he said, that when the Brighton Railway first took up the matter of electrification, the choice lay between low-tension 600-volt direct-current and high-tension

# Federal Commission Ready to Begin

## Personnel of the Commission Appointed to Study the Electric Railway Problems Promises Valuable Results—Chairman Elmquist Outlines the Task Before the Commission—Other Comments Given

RAILWAY men interviewed during the past week have expressed great satisfaction at the appointment by the President of a federal commission to investigate the electric railway situation. These expressions were both individual and collective. Among the latter was the American Electric Railway Association, whose Washington office issued a statement which was widely quoted in the daily press. This said, in part:

"This commission is destined to be a constructive agency of the greatest importance, not only to the public, but to the electric railway industry, to collateral industries, to the nation's financial institutions and to labor. In fact, it was the reflex effect upon industry, finance and labor of the bankrupt transportation companies that played a leading part in the minds of Secretary Redfield and Secretary Wilson, the members of the President's Cabinet, who recommended the establishment of this federal commission."

### Who the Members Are

The names of the members of the commission were published last week, but further information about them may be of interest.

The chairman of the commission, Charles E. Elmquist, has served in various legal and advisory capacities to public utility organizations. During the war emergency he was secretary of a special war committee, created by the National Association of Railway and Utilities Commissioners, to consider the vital problems affecting gas, electric, electric railway and other utilities and the communities served. Mr. Elmquist was born in Osceola, Wis., forty-six years ago. After attending the common schools of Saint Croix Falls, he became an apprentice in a printing shop and was in the newspaper business a number of years. He was graduated from the law school of the University of Minnesota in 1898 and began the practice of the law in Rush City, Minn. In 1900 he was elected county attorney and held this position eight years. In 1909 Mr. Elmquist became a member of the Minnesota Railroad and Warehouse Commission, at a time when the Minnesota rate case was pending in the federal court. The legal and economic questions involved in this case led him to become thoroughly conversant with the facts and the law regarding valuation, rates and other problems common to railroads and other utilities. For a number of years he was chairman of the valuation committee of the National Association of Railway and Utilities Commissioners, which was created to give the state authorities adequate representation before the Interstate Commerce Commission in connection with the valuation of railroads. Since November, 1918, Mr. Elmquist has been president of the National Association of Railway and Utilities Commissioners, as well as its general counsel.

The vice-chairman of the commission, Hon. Edwin F. Sweet, is Assistant Secretary of the Department of Commerce and was formerly Mayor of Grand Rapids, Mich. He also represented the Fifth Michigan District in Congress from 1911 to 1913. While mayor he devised a plan for non-partisan city government which has since been adopted by most commission-governed cities. Mr. Sweet is a man of long experience in public affairs and equipped with special knowledge of commercial conditions through daily contact with them, and brings to the commission not only a broad personal training, but the invaluable records of the Department of Commerce, which are at his disposal.

Louis B. Wehle, who represents the Treasury Department on the commission, is counsel of the War Finance Corporation and consequently has an unusual opportunity to be come acquainted with the financial condition of the electric railways of the country. He is a lawyer and has practiced before the Interstate Commerce Commission since 1910, generally representing the shippers and the public. In addition to his connection with the War Finance Corporation he is a

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ngle-phase, and the instructions he eceived were that a system had to be dopted for the local services which uld be indefinitely extended to include e whole system, including long-distance passenger and goods traffic. This as the reason why he had decided to commend the use of the high-tension ngle-phase system, which he did in 06.

There is every reason to feel gratified ith the reliability of the single-phase uipment in use. The overhead system hich had been put up according to s design and under his supervision as never given the least trouble or xiety and has proved eminently tisfactory from every point of view.

In the meantime high-tension direct-rrent equipment has been developed to a high standard of reliability. Mr. Dawson said that he is not wedded to any one system and, therefore, in considering extensions to the Brighton Railway or in taking up problems for other lines, he would certainly take advantage of every improvement that would help to make electrification pay regardless of system. The Brighton Railway now has 70 miles of single-track electrified line in operation and is prepared to electrify another 120 miles to Cheam and Coulsden, a project which was interrupted by the war. Another 150 miles of development would bring the electrification to the South Coast terminus at Brighton, a stretch of 52 miles, which would be covered in forty-five minutes. There is nothing slow about British electrification! A following electrification would take in Hastings, 75 miles distant, on a section over which trains weighing 300 to 350 long tons would be run at 60 m.p.h.

It is interesting to note that Edward Manville, who is Mr. Dawson's partner, is a member of Parliament for Coventry and is one of the vice-presidents of the Federation of British Industries; a member of the Board of Trade and many other Parliamentary committees. Mr. Manville is a pioneer both in electric lighting and traction, having been responsible for the electric lighting of Victoria Embankment in the early eighties and also having installed some of the earliest examples of electric tramways, namely those at Northfleet and Newcastle.

member of the legal committee of the General Munitions Board and of the War Industries Board and is one of the counsel of the U. S. Shipping Board, Emergency Fleet Corporation. In June, 1917, he was appointed counsel of the Cantonment Labor Adjustment Commission, and in September of the same year counsel of the Federal Shipbuilding Labor Adjustment Board.

Dr. Royal Meeker, who will be the representative on the commission of the Department of Labor is statistician of that department and Commissioner of the Bureau of Labor Statistics. For five years before his appointment to this position by President Wilson in 1913 he was assistant professor of political economy at Princeton University. Dr. Meeker is an independent thinker and an expert in the investigation and presentation of facts. He has recently had occasion to give particular attention to the electric railway situation because of the publication by the Bureau of Labor Statistics, of which he is commissioner, about a year ago, of an extended report on "Street Railway Employment in the United States." This report contained more than 1100 pages.

Hon. George L. Baker, Mayor of Portland, Ore., whose name was mentioned in the Washington reports as the representative of the cities on this commission, is the chairman of the Organization Committee of the American Cities' League of Mayors and a man of long experience in public service and familiar with conditions on the Pacific Coast.

P. H. Gadsden, the electric railway member, is chairman of the Committee on Readjustment of the American Electric Railway Association, a practical operator of public utility plants for more than twenty years and a close student of the problems of the electric railways.

Charles W. Beall, the representative on the commission of the Investment Bankers' Association of America, is a member of Harris, Forbes & Company, of New York City. He has long been active in the work of the Investment Bankers' Association of America, and is qualified as a financial adviser through many years of experience in investment fields.

W. D. Mahon, the representative on the board of organized railway labor, has been president of the Amalgamated Association of Street and Electric Railway Employees, Detroit, Mich., ever since its organization in 1892. He is a member of the executive committee of the National Civic Federation and also of the American Federation of Labor. In 1914 he made a trip to Europe to investigate electric railway labor conditions but was unable to complete this study because of the outbreak of the war. He has devoted his attention for years to the interests of organized labor.

### COMMENTS ON COMMISSION'S WORK

Chairman Elmquist on June 12 issued the following statement in regard to the work of the commission:

"It is the duty of the commission to consider fundamental principles involved in the electric railway situation. Necessarily, the investigation should be upon broad and impartial lines, and it will take some little time to organize the work.

"Perhaps the problem can be stated in this way —Are the utilities suffering from a disease? What is it? Is it curable? What is the best remedy? How can the public secure the best service at the lowest cost?

"The members of the commission realize that the task before them is not a small one. A sub-committee is at work on the plan of the organization, and its report will be considered by the commission at an early date."

In reply to a request from this paper to other members of the commission to make some statement on the proposed investigation, Vice-Chairman Sweet said:

"The newly appointed Federal Electric Railways Commission is undertaking the difficult task of ascertaining the causes of the present bankrupt condition of many electric railways in the United States at this time.

"While doubtless there are differences in the details of the problems in different cities, there must be some general reasons for a condition that so universal.

"What the procedure of the commission will be has not yet been determined, but its members are convinced that there is some way of discovering the principal causes of the unhealthy condition of these properties and this clearly is the first step toward the discovery and application of a remedy.

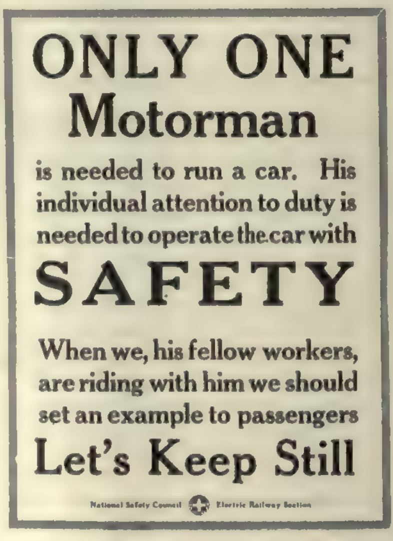
"That a suitable remedy will be found is well nigh certain. Whether the electric railways themselves and the urban and suburban communities served by them will be willing to take the remedies that may be prescribed is another question.

"If a commission made up of representatives of associations of bankers, electric railway companies, electric railway employees and representatives of the public, with all their divergent interests, can come to an agreement as to both cause and remedy, it would seem as if the organizations represented by these several members ought to be like minded, and that would mean a very general, practically universal, acceptance of the conclusions that may be reached by the commission.

"Final action, whatever it may be, must be taken by the various state and municipal governments and the electric railway companies. All the commission can do is to ascertain facts, draw conclusions and make recommendations as a basis for municipal and corporate action later on."

Mr. Meeker stated that he was not prepared to say anything in regard to his plans for work with the commission. "I should be very pleased to give a statement to the ELECTRIC RAILWAY JOURNAL," he said, "but anything I might have to say would better come out in the public hearings, which are about to begin."

## Don't Talk to the Motorman



ONLY ONE
Motorman
is needed to run a car. His
individual attention to duty is
needed to operate the car with
SAFETY
When we, his fellow workers,
are riding with him we should
set an example to passengers
Let's Keep Still

National Safety Council Electric Railway Section

THE accompanying poster, just put out by the electric railway section of the National Safety Council, carries a message that may well be heeded by every employee. It ought to be obvious that distraction of attention from duty is a sure provocative of danger, but nevertheless the fact is not fully realized. The message should be carried also to well-intentioned, friendly passengers who occupy the front platform of cars.

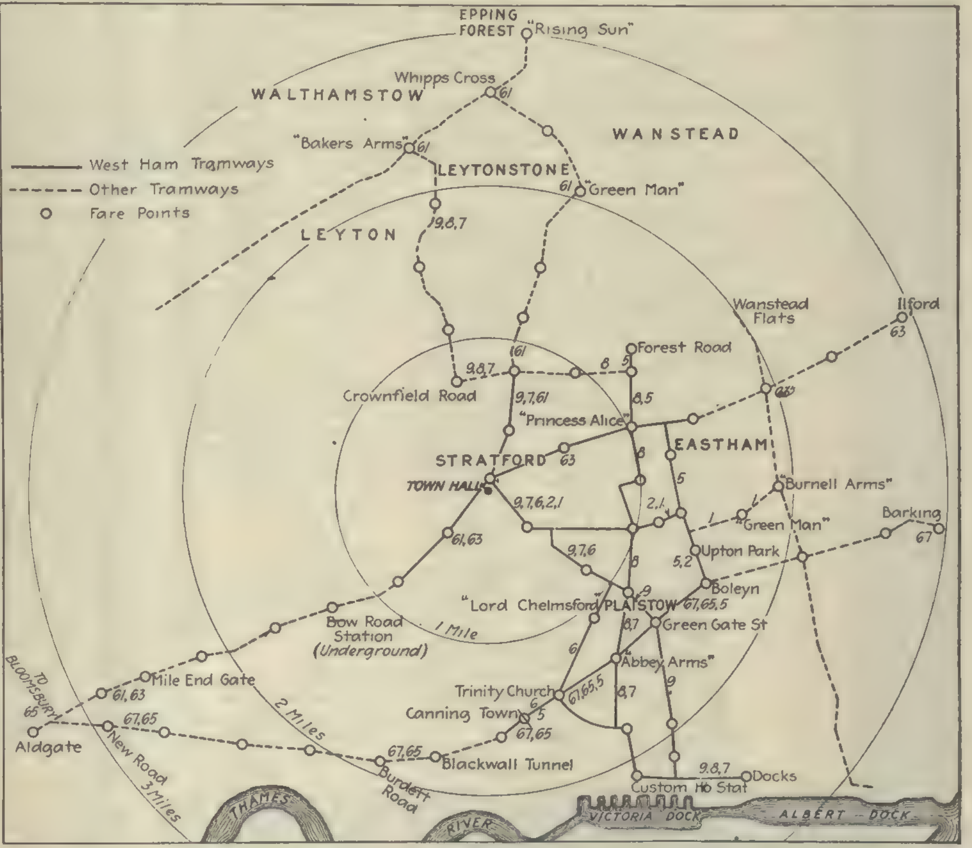
# The Zone Fare in Practice

## WEST HAM

### Universal Fare Tried for a Brief Period but Abandoned—Present Differential Rates Include No Half-Penny Fares for General Use—Although West Ham Is Located in the Most Typical Labor Borough of London, the Average Earnings Per Car-Mile Exceed 30 Cents with Some Lines Earning 40 Cents or More Per Car-Mile, Despite Low-Rate Workmen's and Children's Tickets

BY WALTER JACKSON

THE County Borough of West Ham, which occupies approximately 7½ square miles, lies in the eastern part of London. West Ham is the great dockyards section of London, and naturally it has been a busy center since the opening of the war. With the exception of some detached houses in the northern part, near Epping Forest, West Ham has no suburban areas. Hence the overwhelming majority of its travel comes from working people, a fact well worth bearing in mind in view of the density of short-haul travel.



MAP OF THE WEST HAM TRAMWAYS SYSTEM, SHOWING NUMBERED ROUTES AND THE LOCATION OF FARE POINTS

In accordance with English characteristics, the big tenement house is absent even in this out-and-out laboring community. Two-story houses are the usual thing with nearly always one family to the house. The vital statistics of the borough show a population of approximately 300,000, with 48,207 houses and a density of sixty-two persons per acre. Like every other community in the United Kingdom, West Ham has its housing plans. Up to the present, however, it has built only eleven one-family houses and 390 dwellings suitable for more than one family. Part of these structures have been erected on sites of condemned property, as at High Street, and part on open ground, as at Plaistow. The real difficulty here as elsewhere is not too much population but too many antiquated dwellings hich are not provided with the conveniences essential o decent, comfortable living in the twentieth century.

The trackage owned by the borough tramways within West Ham equals 16.75 miles of route or 30 miles of ingle track. This does not convey a true idea of the vailable service, however, as the West Ham Corporation Tramways have through-running arrangements with the London County Council Tramways on the west, the East am Corporation Tramways on the east and the Leyton, Walthamstow, Barking and Ilford Urban District Councils Tramways on the north. The routes now oper-ed by the West Ham Corporation Tramways, shown on the accompanying map, comprise the following (the miles indicated are route-miles):

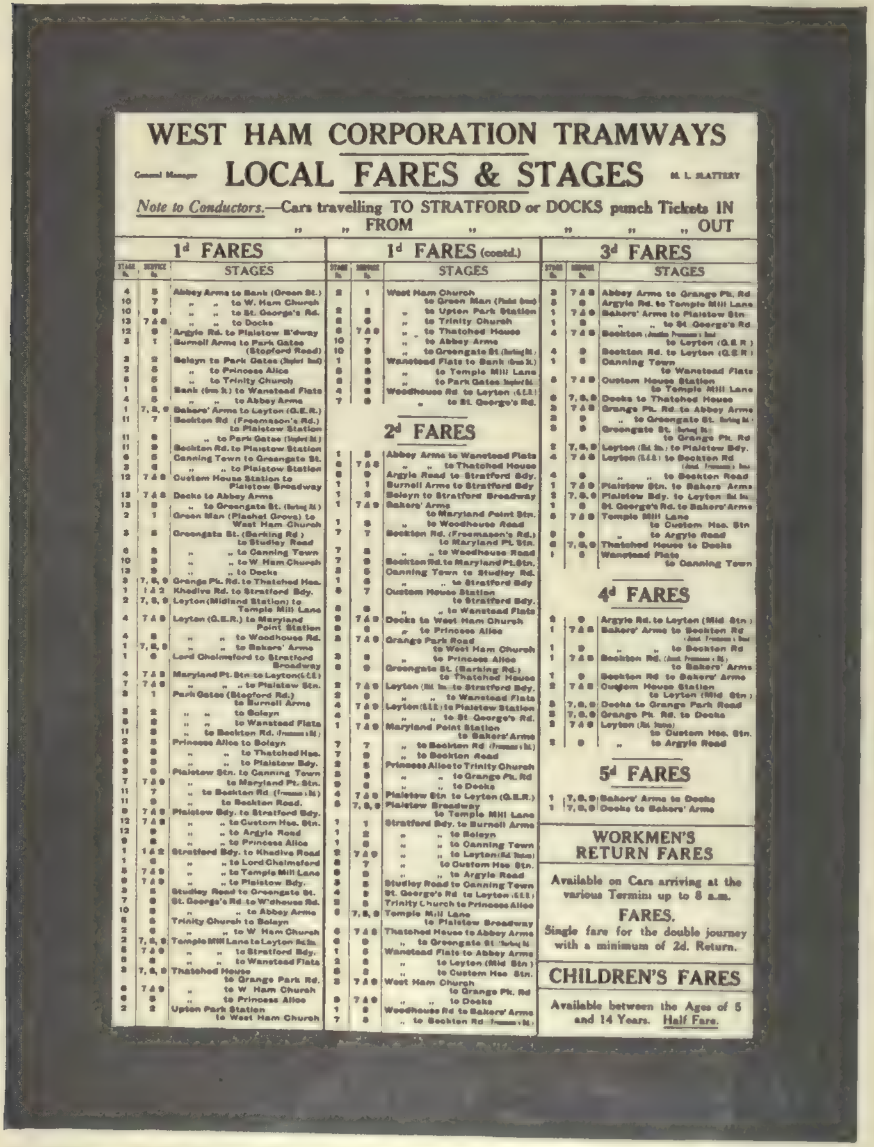
*Aldgate and Barking, Route 67*, 7.2 miles long, is operated through a purely working-class district. Before the coal shortage crisis, this line had a two and one-half-minute headway. The present service has a headway of three minutes morning and evening and four minutes at other times. Aside from this liberal service, it will be seen from the route map that about 5 miles of Route 67 is overlapped by Route 65 and about 2 miles by Route 5, as described below.

*Aldgate and Ilford, Route 63*, runs through the business section and also serves the best residential district. It is 7.06 miles long. Like Route 67, the two and one-half-minute service has been changed temporarily to three minutes and four minutes for rush and off-rush hours respectively. On this line, too, 5 miles of the route enjoy an overlapping service.

*Aldgate and Leytonstone, Route 61*, 7.9 miles long, has a minimum headway of three minutes and a maximum headway of four minutes. Although part of the cars on this line are turned back, the four-minute service is maintained all the way to "Bakers' Arms." This, like several other destinations in West Ham and vicinity, is the name of an inn of non-prohibition character. An attempt some years ago to change such stage terminal designations for the names of churches did not meet with much public approbation.

*Docks and Bakers' Arms via Stratford, Route 7*, 6.6 miles long, is the great south-north route terminating in a good residential section. The shortest headways are five minutes, and the longest six minutes. The overlaps on this route are also shown on the route map.

*Docks and Bakers' Arms via Wanstead Flats, Route 8*, 2.8 miles long, serves a better-grade residential section. For three-fourths of its length this route runs in common with Route 7, simply making a detour as indicated on the map. The usual headway is ten minutes, with a headway of slightly less than three minutes (eighteen cars an hour) during the rush.



WEST HAM CORPORATION TRAMWAYS

General Manager LOCAL FARES & STAGES M. L. SLATTERY

*Note to Conductors.*—Cars travelling TO STRATFORD or DOCKS punch Tickets IN
" " FROM " " " " OUT

1d FARES

1d FARES (contd.)

2d FARES

3d FARES

4d FARES

5d FARES

WORKMEN'S RETURN FARES

Available on Cars arriving at the various Termini up to 8 a.m.

FARES.

Single fare for the double journey with a minimum of 2d. Return.

CHILDREN'S FARES

Available between the Ages of 5 and 14 Years. Half Fare.

POSTER, COVERING ORDINARY FARES, AS POSTED ON THE CAR BULKHEAD

*Stratford and Canning Town, Route 6*, 2.5 miles long, formerly extended another 1¼ miles to Burdett Road. Ordinary service has a twelve-minute headway, and rush-hour service a ten-minute headway.

*Stratford and East Ham, Route 1*, 2.45 miles long, has a ten-minute all-day service from 7.30 a.m., supplemented by service on the Stratford-Upton Park line, which also has a ten-minute service and overlaps Route 1 for 1.6 miles.

*Stratford and Upton Park, Route 2*, 1.23 miles long, has a ten-minute all-day service supplemented by Route 1.

*Docks and Green Gate, Route 9*, 1.35 miles long (shortened from Bakers' Arms because of fuel shortage) now has no all-day service, as Route 7 is available. It has a special service three times a day, however, for the convenience of dock workmen, as follows: Three-minute service from 5 a.m. to 9 a.m., five-minute service from 12 noon to 2 p.m. and three-minute service from 5 p.m. to 8.30 p.m. In short, this route is simply an extra traffic artery for rush-hour conditions.

*Wanstead Flats and Canning Town, Route 5*, 3.64 miles long, has a ten-minute service with special cars as required. This line is an excellent example of the way West Ham routes overlap. Between Canning Town and Boleyn it runs in common with Routes 65 and 67, and between Canning Town and Trinity Church with Routes 65, 67 and 6. Between Boleyn and the Bank, Green Street, it runs with Route 2. After dropping Route 2, it picks up Route 63 for a few hundred feet and then keeps company with Route 8 up to the Wanstead Flats terminus.

*Bloomsbury, Route 65*, belongs to the London County Council Tramways. It runs over West Ham tracks *via* Aldgate, supplementing the service of Route 67 for the 5 miles from Aldgate to Boleyn with a four-minute morning and evening service of its own.

In addition to the foregoing, a special service is given between the Docks and Abbey Arms, a distance of 1.6 miles.

From the foregoing detail of services, overlaps, etc., it is plain that West Ham enjoys the short headways that are so essential for the development of short riding. Because of the highly industrial character of the population, the spread of hours of service is greater than on many other British tramways. Even now the first car is out at 3.45 a.m., and the last car is in at 12.05 a.m. The special workmen's cars are run chiefly from 5 a.m. to 8 p.m. The heaviest peaks are from 7 a.m. to 9 a.m. and from 5 p.m. to 7.30 p.m. The lunch riding factor is not so important as in other communities.

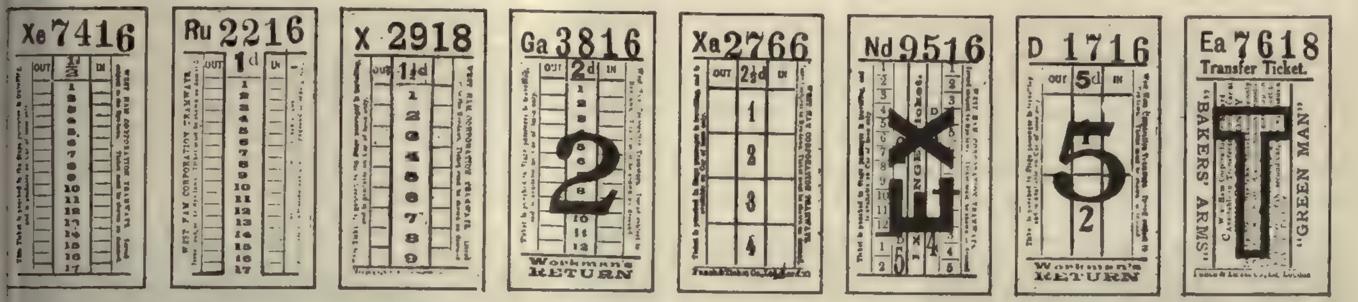
The variety of rolling stock (much of it old), the greatly augmented travel, the narrow streets and the extraordinary amount of trucking on some of the routes do not permit a better average schedule speed than 7.66 m.p.h. Cars on some of the longer routes, however, attain 9 m.p.h. with a free running speed of 16 m.p.h.

Up to June 27, 1917, the fares in use on the lines of the West Ham Corporation Tramways were:

½d. for stages up to 1.18 miles
1d. from 1.32 up to 2.54 miles
1½d. from 2.2 up to 3.78 miles
2d. from 3.16 up to 5.33 miles
2½d. from 3.98 up to 7.22 miles
3d. from 5.04 up to 7.82 miles
3½d. from 6.02 up to 7.01 miles
4d. for 6.57 miles

From the foregoing figures it will be seen that the average fare was about ½d. a mile. This was not the worst, as children were getting the penny rides for ½d. and other rides up to 2½d. inclusive for 1d., while workmen who bought return (round-trip) tickets, taking the first ride before 8 a.m., also enjoyed approximately one-half the regular rates. As a result, the average fare per passenger for the fiscal years ended March 31 was: 0.828d. in 1914, 0.852d. in 1915, 0.824d. in 1916, and 0.840d. in 1917. Only Glasgow, with 0.76d. per passenger (in 1915), was giving lower fares than West Ham.

Although the West Ham system was obtaining greatly



WEST HAM TRAMWAYS TICKETS, INCLUDING TRANSFER AND UNIVERSAL EXCHANGE TYPE

ncreased traffic on account of war activities, the net vas going down. As early as January, 1916, the mangement submitted to the Tramways Committee a eport covering three possible ways of increasing the eturns from traffic. The first plan, for a universal fare f 1d. throughout the borough for all classes of traffic, vas adopted but did not go into effect before June 27, 917.

Under this plan, familiar enough in the United tates, the average ride for 1d. was estimated at 2¼ niles and the longest ride at 3½ miles.

| ear Ended March 31 | Passengers Per Car-Mile | Car-Miles | Passengers Carried | —Gross Receipts— £ Total | Pence Per Car-Mile |
|---|---|---|---|---|---|
| 1914 | 10.95 | 3,756,354 | 41,152,502 | 142,635 | 9.11 |
| 1915 | 11.35 | 3,760,361 | 42,667,561 | 151,490 | 9.66 |
| 1916 | 12.82 | 3,645,165 | 46,734,440 | 163,858 | 10.78 |
| 1917 | 12.96 | 3,650,855 | 47,326,816 | 165,821 | 10.90 |
| *1918 | 12.18 | 3,592,258 | 43,764,149 | 188,432 | 12.58 |

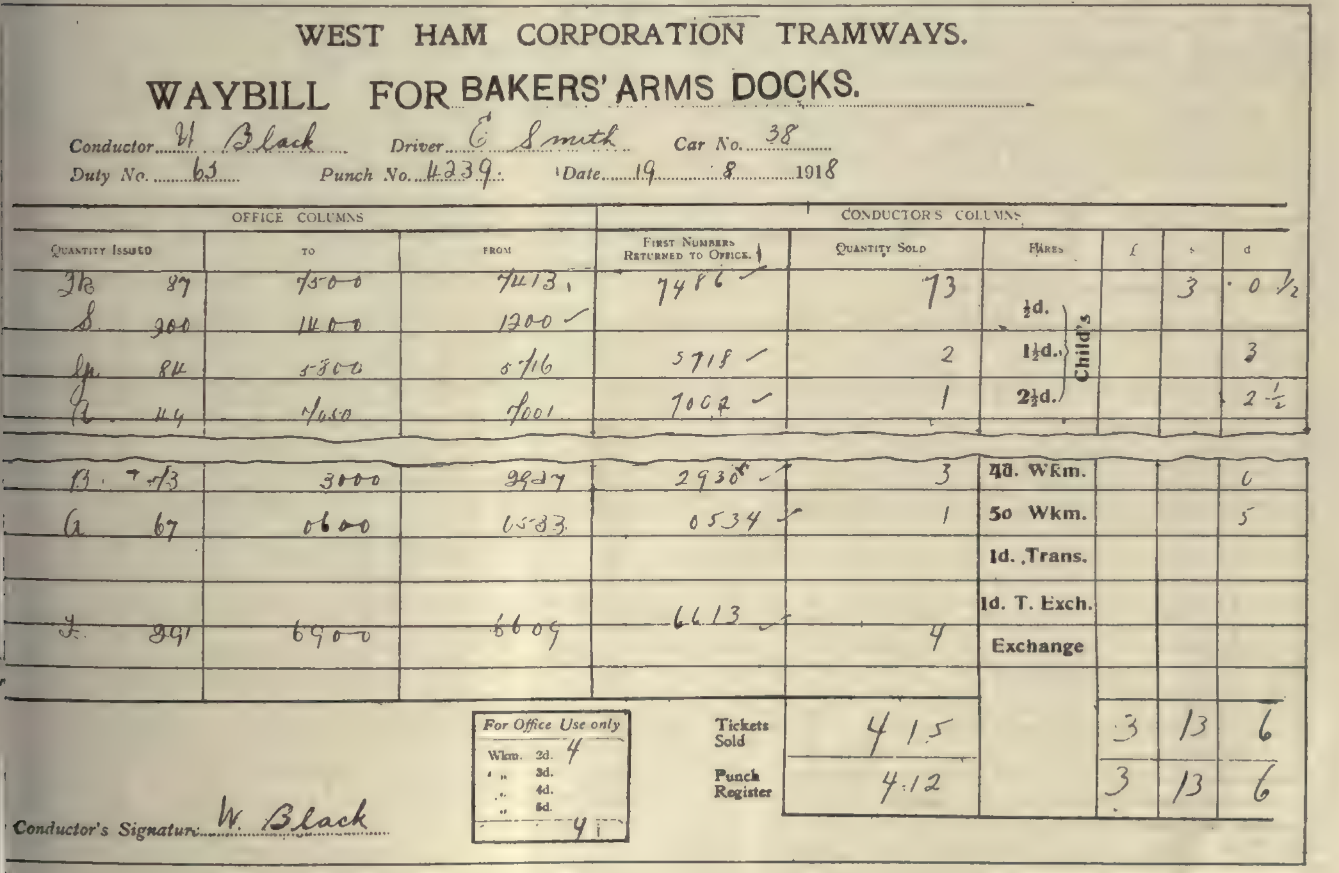
*Nine months and four days of universal penny fare.

While the universal penny fare naturally raised the eturn per passenger (to 1.056d.), it discouraged the d half-penny riders to such a degree that the traffic actually fell off 7½ per cent during a period of constantly increasing activity. This is succinctly shown in the preceding table.

It would not be fair to blame the principle of the universal fare altogether, as there would surely have been some drop in traffic following any scheme that obliterated the half-penny fare. Yet it is a curious fact that the return to a graded fare, with ½d. tickets and other fractional fares for children only, has been followed by most gratifying increases in traffic and revenue.

Although the nine months to Jan. 2, 1919, include the period from April 1-June 30, which saw the end of the universal fare, they show such increases over the corresponding nine months to Jan. 2, 1918, that banner returns are forecast for the year ended March 31, 1919:

| Nine Months Ended | Passengers Per Car-Mile | Car-Miles | Passengers | —Gross Receipts— £ Total | Pence Per Car-Mile |
|---|---|---|---|---|---|
| Jan. 2, 1918 | 12.12 | 2,754,794 | 33,398,492 | 145,974 | 12.79 |
| Jan. 2, 1919 | 14.26 | 2,612,867 | 37,376,966 | 181,848 | 16.70 |



WEST HAM CORPORATION TRAMWAYS.

WAYBILL FOR BAKERS' ARMS DOCKS.

*Conductor* W. Black *Driver* E. Smith *Car No.* 38

*Duty No.* 63 *Punch No.* 4239 *Date* 19 8 1918

| OFFICE COLUMNS | | | | CONDUCTOR'S COLUMNS | | | | |
|---|---|---|---|---|---|---|---|---|
| QUANTITY ISSUED | TO | FROM | FIRST NUMBERS RETURNED TO OFFICE. | QUANTITY SOLD | FARES | £ | s | d |
| Rc 87 | 7500 | 7413 | 7486 | 73 | ½d. | | 3 | 0½ |
| S. 200 | 1400 | 1200 | | | | | | |
| Lp. 84 | 5800 | 5716 | 5718 | 2 | 1½d. Child's | | | 3 |
| R 44 | 7050 | 7001 | 7007 | 1 | 2½d. | | | 2½ |
| B. 73 | 3000 | 2927 | 2930 | 3 | 4d. Wkm. | | | 0 |
| G 67 | 0600 | 0533 | 0534 | 1 | 5d Wkm. | | | 5 |
| | | | | | 1d. Trans. | | | |
| | | | | | 1d. T. Exch. | | | |
| E. 291 | 6900 | 6609 | 6613 | 4 | Exchange | | | |
| | | | Tickets Sold | 415 | | 3 | 13 | 6 |
| | | | Punch Register | 412 | | 3 | 13 | 6 |

*For Office Use only*

| | | |
|---|---|---|
| Wkm. | 2d. | 4 |
| " | 3d. | |
| " | 4d. | |
| " | 5d. | |
| | | 4 |

*Conductor's Signature* W. Black

CONDUCTOR'S WAYBILL COVERING A FULL DAY'S WORK

The average fare per passenger thus increased from 1.049d. to 1.168d. While a portion of the increase in receipts per car-mile was the result of an enforced cut in mileage, the increases in the number of passengers and the gross receipts speak for themselves. It is estimated by Lewis Slattery, general manager, that the total travel for the year ended March 31, 1919, will be approximately 50,000,000 passengers despite a reduction of 250,000 car-miles. For the five weeks ending Jan. 2–Jan. 30, 1919, the total traffic was 4,567,980, of which approximately 69 per cent was in 1d. fares, 15 per cent in 2d. fares, 6 per cent in ½d. fares and 3 per cent in 3d. fares. The armistice has had no perceptible influence on traffic, and as West Ham is a shipping center *par excellence* there is no reason to expect a decline.

At this time, the rates on both tramways and buses in West Ham are practically the same. Although the buses seat but one-half as many passengers as the average West Ham car, they are faster only where exceptionally heavy drayage delays the cars. On Sundays the buses are not in it for speed.

To conclude the data on revenue, the following figures are presented in the solemn hope that they will forever dispel the idea that the differential fare system is applicable only to small cars and non-congested traffic. The *seating* capacity of the 118 double-deck cars used (106 of which are single-truck) ranges from sixty to seventy-eight, and the number of passengers per car-mile often exceeds twenty! Here are the figures:

During Christmas week, earnings per car-mile were 24.9d. on Route 2, 22.85d. on Route 67, 22.43d. on Route 63, 19.89d. on Route 7, 18.75d. on Route 61 and 24.86d. on Route 67. These routes furnished 13,215 car-miles for 268,927 passengers, and therefore carried twenty passengers per car-mile.

For the week ended Jan. 2, 1919, the car-mile earnings were 22.7d. on Route 2, 20.2d. on Route 67, 20.2d. on Route 63, 17d. on Route 7 and 19.07d. on Route 61. These figures indicate traffic conditions now.

Greengate Street, Plaistow

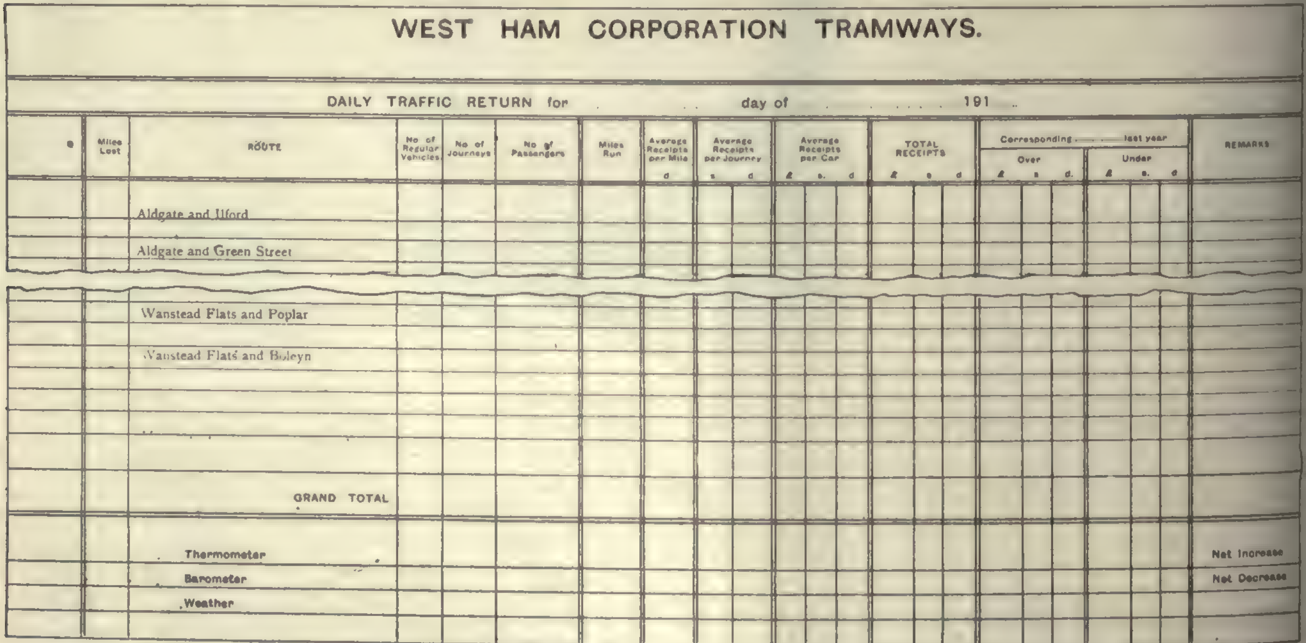
Glasgow Road, Plaistow

Neville Road

THESE HOMES OF WEST HAM WORKERS ARE VISUAL ANSWERS TO "THE ZONE FARE IN ENGLAND CAUSES CONGESTION"

### PRESENT FARES AND NUMBERED STAGE TICKETS

Under the revised system of differential fares following the discarding of the universal fare on June 30, 1918, the lowest fare, except for children, remains 1d. All fractional fares such as ½d., 1½d. and 2½d. apply only to children, who are entitled to ride at half rates if between the ages of five and fourteen years. Workmen cannot buy anything less than a 2d. return ticket. The abolition of the half-penny intervals is in



WEST HAM CORPORATION TRAMWAYS.

DAILY TRAFFIC RETURN for . . . day of . . . . . 191 . .

|  | Miles Lost | ROUTE | No of Regular Vehicles | No of Journeys | No of Passengers | Miles Run | Average Receipts per Mile d | Average Receipts per Journey s d | Average Receipts per Car £ s. d | TOTAL RECEIPTS £ s d | Corresponding . . . last year Over £ s d. | Corresponding . . . last year Under £ s. d | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Aldgate and Ilford |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Aldgate and Green Street |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Wanstead Flats and Poplar |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Wanstead Flats and Boleyn |  |  |  |  |  |  |  |  |  |  |  |
|  |  | GRAND TOTAL |  |  |  |  |  |  |  |  |  |  |  |
|  |  | Thermometer |  |  |  |  |  |  |  |  |  |  | Net Increase |
|  |  | Barometer |  |  |  |  |  |  |  |  |  |  | Net Decrease |
|  |  | Weather |  |  |  |  |  |  |  |  |  |  |  |

HEADINGS OF DAILY (AND WEEKLY) TRAFFIC RETURN FILLED OUT BY THE TICKET DEPARTMENT ROUTE FOR ROUTE AND TOTALIZED consonance with the action of the tramways and the bus companies in the east end of London.

Forest Gate — Romford Road, East Ham — Green Street

NEITHER BUSINESS NOR RESIDENTIAL STRUCTURES ARE BUILT HIGH ENOUGH TO SCRAPE THE SKY OVER WEST HAM

As arranged now, the general plan is to give three half-mile stages for 1d., each stage forming a starting point so that the conductor is expected to collect the fare within the first half-mile after the passenger has boarded the car. Of course, the arrangement of stage lengths and numbers is not absolutely hard and fast. There are cases where the passenger gets two stages for a penny and other instances where he gets four. Full-rate fares are 1d., 2d., 3d., 4d., 5d.; and workmen's fares, 1d. for a single trip (in area of London County Council only) and 2d., 3d., 4d. and 5d. for a return (round) trip. On the whole, the increase in fare to the lowest-rate rider was 100 per cent and to the others about 50 per cent.

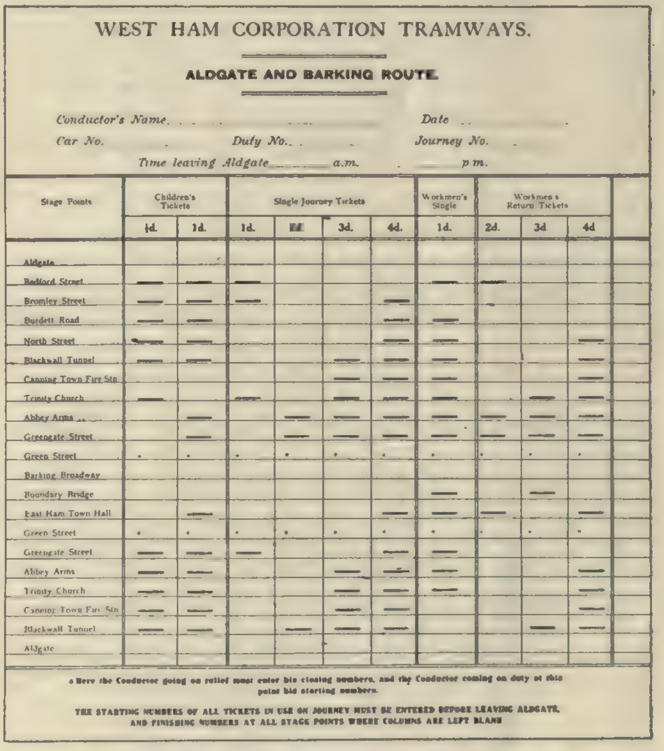
A feature which contributes greatly to the simplification of the tickets is the numbered designation of the stages for each rate of fare as the illustration on page 1165 shows. This makes it possible to use one size of ticket for every rate of fare, the differences being prominently indicated partly by color and partly by surprinting the workmen's return tickets, which have the same color as regular single tickets of like denomination. The stages or zones are indicated by a single row of figures down the center of the ticket, the conductor punching the space opposite the number on the "in" or "out" side as the direction of travel demands. Any uncertainty as to what stages the zone numbers represent can be settled at once by reference to the "Fares and Stages" placards which are posted in every car, separate red-bordered placards being used for workmen's, local and through rates. A specimen local placard is reproduced herewith. Only the fractional fare children's tickets are issued and canceled as such; on others the conductor is permitted to advance the number of stages by punching.

When the holder of a workmen's ticket presents it for the return journey, he receives an "exchange ticket" therefor. In order to avoid the issuance of too many special tickets, the West Ham Corporation Tramways uses a single type, devised by William Hopkins, principal assistant, with which one punching serves for the stage designation and another punching for the price of the original ticket. A ticket inspector by comparing price and stage numbers can tell at once whether the passenger is over-riding. In accounting for tickets, the workmen's return tickets collected must equal the number of exchange tickets issued for them.

A transfer ticket is also used to a limited extent on one line, Route 61, where some of the cars do not go through on Sundays and holidays from Whipps Cross Junction to either the "Baker's Arms" or the "Rising Sun," two of the gratuitously advertised inns. The passenger who knows no better would have to buy a second ticket for a penny in order to complete his journey on the second car, but nearly every passenger names his destination and, if necessary, he gets a transfer ticket in addition to the usual ticket covering the ride to Whipps Cross. This ticket carries the customary identifying letters and serial numbers but no date or other time marking. The slight extent of this transfer traffic, however, makes no elaborate checking necessary.

Because of the compactness of the territory of the West Ham Corporation Tramways, only one operating carhouse is used—a circumstance which helps greatly to simplify the handling of tickets and cash. In fact, the receiving department where the tickets are made up and the returns checked is in the office building adjacent to the depot.

Conductors, therefore, obtain their supplies without the formality of making out personal requisitions which



WEST HAM CORPORATION TRAMWAYS.

**ALDGATE AND BARKING ROUTE.**

*Conductor's Name* ............ *Date* ............
*Car No.* ............ *Duty No.* ............ *Journey No.* ............
*Time leaving Aldgate* ............ *a.m.* ............ *p.m.*

| Stage Points | Children's Tickets | | Single Journey Tickets | | | | Workmen's Single | Workmen's Return Tickets | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ½d. | 1d. | 1d. | [illegible] | 3d. | 4d. | 1d. | 2d. | 3d. | 4d | |
| Aldgate | | | | | | | | | | | |
| Bedford Street | — | — | — | | | | — | — | | | |
| Bromley Street | — | — | — | | | — | | | | | |
| Burdett Road | — | — | | | | — | — | | | | |
| North Street | — | — | | | | — | — | | | — | |
| Blackwall Tunnel | — | — | | | — | — | — | | | — | |
| Canning Town Fire Stn | | | | | — | — | — | | | — | |
| Trinity Church | — | | — | | — | — | — | | — | — | |
| Abbey Arms | | — | | — | — | — | — | — | — | — | |
| Greengate Street | | — | | — | — | — | — | — | — | — | |
| Green Street | • | • | • | • | • | • | • | • | • | • | |
| Barking Broadway | | | | | | | | | | | |
| Boundary Bridge | | | | | | | — | | — | | |
| East Ham Town Hall | | — | | | | — | — | — | | — | |
| Green Street | • | • | • | • | • | • | • | • | • | • | |
| Greengate Street | — | — | — | | | — | — | | | | |
| Abbey Arms | — | — | | | — | — | — | | | — | |
| Trinity Church | — | — | | | — | — | — | | | — | |
| Canning Town Fire Stn | — | — | | | — | — | | | | — | |
| Blackwall Tunnel | — | — | | — | — | — | | | — | — | |
| Aldgate | | | | | | | | | | | |

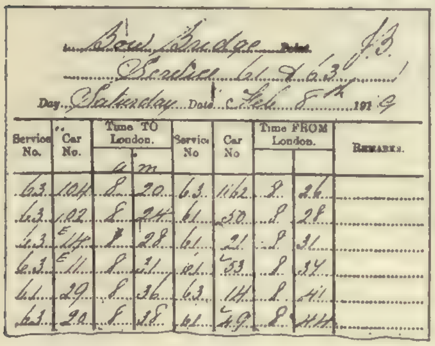
• Here the Conductor going on relief must enter his closing numbers, and the Conductor coming on duty at this point his starting numbers.

THE STARTING NUMBERS OF ALL TICKETS IN USE ON JOURNEY MUST BE ENTERED BEFORE LEAVING ALDGATE, AND FINISHING NUMBERS AT ALL STAGE POINTS WHERE COLUMNS ARE LEFT BLANK

FORM FILLED IN BY CONDUCTORS IN SEMI-ANNUAL SURVEY OF TRAFFIC ON JOINTLY-OPERATED ROUTES must be filled from auxiliary stockrooms. Instead, they turn over to depot inspectors boxes containing their cash, tickets, punch and waybill. The depot inspector counts the money in their presence and gives them receipts. Duplicates of these remain in the receipt book, which is sent to the receiving department at the end of the day. The conductors are supposed to make blind returns, but most of them are known to see pretty clearly! On beginning the next day's work, each conductor receives a second box containing another punch, a waybill and a complete supply of tickets in accordance with his probable requirements.

If, perchance, the conductor does run short in the course of the day, he is at liberty to borrow a pad of tickets from some other conductor. This is easy enough as the tickets of one denomination are always alike no matter where used. The West Ham Corporation Tramways does not print its own tickets and so does not feel like going to the further refinement of printing route or service numbers on the tickets. This would mean ordering and storing a much greater supply of tickets and involve too much dependence upon the printer sending stock in exactly as wanted. Incidentally, it may be remarked that the universal, numbered ticket has justified itself as a war measure in the saving of paper.

The all-day waybill is another feature that has been adopted to reduce the labor in connection with fare accounting from the car to the cashier. Individual trip waybills have been discarded as involving too much detail for all concerned. The present waybill, reproduced on page 1165 carries on its face the identification of the crew, the duty (run) number corresponding to the box number, the car number and the date. In the first three columns the girl who fills the ticket box writes in the letters, quantities and serial numbers of the tickets issued. In the remaining columns, the conductor records the top numbers of the tickets returned, the number and the value of each denomination sold and also the total tickets sold. The back of the waybill shows the commencing number of the tickets on each trip and the time the car left, both written in by the conductor. In practice, cash is not turned in every trip but on the completion of duty.



Bow Bridge Point J.B.

Service 61 & 63

Day Saturday Date Feb 8th 1919

| Service No. | Car No. | Time TO London. | | Service No | Car No | Time FROM London. | | REMARKS. |
|---|---|---|---|---|---|---|---|---|
| | | a | m | | | | | |
| 63 | 104 | 8 | 20 | 63 | 1162 | 8 | 26 | |
| 63 | 102 | 8 | 24 | 61 | 50 | 8 | 28 | |
| 63 | E 14 | 8 | 28 | 61 | 21 | 8 | 31 | |
| 63 | E 11 | 8 | 31 | 61 | 53 | 8 | 34 | |
| 61 | 29 | 8 | 36 | 63 | 14 | 8 | 41 | |
| 61 | 20 | 8 | 38 | 61 | 49 | 8 | 44 | |

INSPECTOR'S REPORT ON ADHERENCE OF WEST HAM AND FOREIGN CARS TO SCHEDULE

The receiving department is in charge of tickets, punches, waybills, cash, etc., its functions extending from the reception of new tickets to the making out of the daily (and weekly) traffic returns by routes for the several items reproduced in the form on page 1166. All cash goes to the bank, but the borough treasurer is responsible for such audits as are made from time to time. The cash as turned in to the receiving department by the depot inspectors does not come with the boxes of the individual conductors but is already made up into half-penny bags containing 2s. 6d., penny bags containing 5s. and bags of silver coins containing £5.

The total cash received from each depot inspector must, of course, tally with the total of the individual receipts turned in by him. It need not tally with the totals on the waybills themselves, as the latter are sure to have some shorts and overs for which the conductors are responsible. Shorts are made up out of wages instead of on the spot, since the inspector merely receipts for money deposited and does not check either the waybill or the tickets. Overs are retained.

For each duty number three boxes are used, namely, one for Mondays, Wednesdays and Fridays; a second for Tuesdays, Thursdays and Saturdays, and a third for Sundays. As far as practicable, the tickets for each duty number are issued in rotation. There are 180 regular duty numbers, making 540 boxes. A punch does not go necessarily with all the boxes in reserve, as the number of punches is 430 in comparison with 230 conductors and 540 boxes. The punches are rented from the Bell Punch & Ticket Company at a figure which includes maintenance and transportation of repaired punches back and forth.

The receiving system described demands eight girls for filling boxes, making out and checking waybills, handling cash, preparing traffic records, etc.; one girl for emptying punches and making counts occasionally, resetting the punches and resealing them, and the executive—or ten in all. The head of the receiving department states, however, that three girls could be dispensed with if no record were kept in a detail stock book of the duty numbers to which the tickets are assigned. This information appears on the waybills in any event, and its transfer to the tally book is in accordance with a requirement of the borough authorities. Two calculating machines are used in this department.

The depot inspectors, who hand out and receive boxes and count cash as described, number only six, four of whom are on duty throughout the day, five during rush hours and two at night. These men are really depot clerks or dispatchers, as they serve also as timekeepers, check signing on and off, etc. It is stated that not one of these men could be spared in case the universal fare were used. In fact, during the period that the West Ham Corporation Tramways operated on a universal fare, fare receipts were given exactly as under the differential fare system, as it was felt that the conductor ought to have an interest in seeing that the passenger paid his fare and the passenger ought to have evidence that he had paid it.

For checking conductors and examining passengers' tickets, ten men are employed. They are not used exclusively in ticket-inspection service, since traffic regulation along the line is also part of their duty. These

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**LEWIS SLATTERY**, general manager West Ham Corporation Tramways, has had the benefit of experience in almost every kind of tramway operation from horses and compressed gas to electric conduits and overhead trolley. During his eight years as general manager of the Blackpool, St. Anne's & Lytham Tramways he did considerable pioneering with compressed gas cars, being the first operator to try them. On leaving Blackpool, he became general manager of the Oldham Corporation Tramways, and still later he was traffic manager of the London County Council Tramways for five and one-half years. Mr. Slattery has been general manager at West Ham since October, 1916, during a period replete with problems of man and equipment shortage in a district where the war made great demands for service under peculiarly arduous conditions.

men board about six cars an hour or sixty a day, the number of checks per conductor running up to four or five a day. The conductor attests the inspector's visit by his signature.

As previously mentioned, the average schedule speed of the West Ham Corporation Tramways is 7.66 m.p.h. The heavy drayage in the West Ham district is a serious factor—serious enough, in fact, to warrant prosecution of vehicle owners when their wagons break down because of defective equipment! This is a view of the situation that ought to interest the American operator.

The distances between stops are considered to be unnecessarily short, the spacing in West Ham being five poles or 600 ft. The only compulsory stops are those established by the Board of Trade, and these do not include fire station or school stops but simply places where the physical conditions are unfavorable. Optional stops are shown by blue signs, and compulsory stops by red ones. By order of the Metropolitan District police, who control the area 12 miles from the center of London, car stops are made on the far side to avoid danger to intending tram passengers from the buses, which stop on the near side.

In addition to the ten inspectors, who inspect tickets and regulate traffic along the line, the West Ham system employs eighteen traffic regulators who are stationed at the more important traffic control points. These men order cars to start while the conductors are already collecting fares, and they help to maintain orderly loading at the dockyards and other heavy traffic centers. No space is available for prepayment areas. All entrance and exit on cars is via the rear platform except at terminals.

An illustration on page 1168 shows the style of report made by traffic regulators on the adherence of cars to schedule. In this report the letter "E" designates East Ham cars, "L" the Leyton cars and the four-numbered cars the rolling stock of the London County Council Tramways. The remaining numbers are understood to refer to West Ham cars.

SEMI-ANNUAL TRAFFIC SURVEY DETERMINE DIVISION OF EARNINGS

Semi-annually a detailed seven-day traffic survey is made on the joint Route 67 in order to make a fair division of earnings. For this purpose, the conductor is asked to enter the finishing numbers of his tickets at all stage points left open for that purpose on a form of the sort reproduced. The traffic regulators check this tally by boarding the cars and examining the waybills at the points specified. Joint Routes 61 and 63 are deemed to be of equal earning power throughout heir length.

The telephone control system of the West Ham Corporation Tramways is one of its most important factors n traffic control. It will be discussed in a separate rticle.

Like other British tramways, the West Ham system has a large proportion of women conductors. Conductresses are paid at the rate of 11½d. an hour, which averages £2 18s. 3d. (approximately $13.98) a week. Motormen and conductors who received 7½d. n hour or £1 16s. 3d. for six-day periods before the war are now paid £3 6s. 3d. ($15.90). Time at one nd one-quarter is paid to employees who work on heir rest day, Sundays or overtime. After six months ervice a platform employee is entitled to three days acation with pay, and after twelve months service to six days in addition to one day off as an equivalent for each of the public holidays such as Christmas, Boxing Day, Easter, Good Friday, Whit-Monday and August Bank Holiday.

Regulars have the same run for a week at a time, taking an early run one week, as from 3.45 a.m .to 1 p.m., and the next week from 1 p.m. to 11 p.m. Out of ten hours, about nine hours are actual platform time. Substitutes take over the duty of the men replaced, but reliefs are on a different run every day in rotation.

## W. H. Taft on Higher Fares

### In Newspaper Article He Gives Reasons for Their Advance—Remedy for Existing Conditions Must Be Found

IN A COPYRIGHTED article in the Philadelphia *Public Ledger* for the morning of June 12 Ex-President William H. Taft contributes an article entitled "Higher Street Car Fares Seem to Be Inevitable." He begins by saying that while the financial situation of the general steam railroad system of the country is bad enough, it is far better than that of the electric street and suburban railway systems. After pointing out that the long use of the nickel fare has trained the public to regard anything more as an infringement upon its rights and privileges, he points out that "5 cents under present conditions is generally not reasonable compensation for the service rendered in any city." Even before the war, materials were increasing in price, and labor had been kept down simply through the necessity of circumstances of the street railways.

Ex-President Taft then gave the reasons for the organization of the National War Labor Board whose position was that wages were not a subject which could be affected by the question of profit of operation, but must be governed by the range of wages for similar service in the same community and by minimum limitation as to the cost of living. While the increases in wages awarded by the board added to the necessary expenditures of the railway companies, the board recommended in every case that an increase in fares was only just to the owners of the street railway companies. Mr. Taft then discusses the question of municipal ownership with and without losses made up by taxation, but does not recommend either plan. In conclusion he says:

"But whatever the remedy to be undertaken, the condition of investments now reaching at least $5,000,000,000 in the country is so serious that public attention should be aroused to the necessity of devising ways and means to meet the crisis."

## Reduction of Ash Content in Screenings

In a paper presented by the general fuel inspector of the Illinois Central Railroad at the 1919 convention of the International Railway Fuel Association, the statement is made that the ash content of screenings can be reduced nearly to that of the screened lump by the use of a jig gravity washer with an ample water supply and located in a place convenient for depositing the refuse. For example, in the case of a coal from one mine in the Central West the dry or unwashed screenings contained 22.6 per cent ash and 8895 B.t.u. per pound. By washing, the ash was reduced to 14.1 per cent and the B.t.u. content increased to 10,085. The lump coal contained 12.4 per cent ash and 10,499 B.t.u.

# Safety Car Is a Live Proposition*

## This Type of Equipment in Both Large and Small Cities Will Give Better and More Frequent Service

By P. J. KEALY
President Kansas City (Mo.) Railways

THE safety car is a subject which is now occupying the attention of operators of both small and large properties and which merits all the study being given to it. While not thinking it is the solution of all our difficulties, I do believe it is destined to be the largest single factor from the operating standpoint in meeting the present transportation problem.

In Kansas City we are not yet prepared to say from our own actual experience that the car, as we now know it and as it is being standardized by its makers, is all that it should be. It is still subject to refinements and changes, which it is hoped will be developed and worked out by the car builders. But the idea is right and it has come to stay, and in many cases will save the situation.

### 2500 SAFETY CARS NOW IN USE

A report of the American Electric Railway Association, issued as of April, 1919, shows that there are at present eighty companies, serving a population of four million, operating more than 2500 safety cars. More than half of the companies reporting are 100 per cent one-man operated. This report is very instructive as showing the economies and the increase in net which result from safety-car installation. The average reduction in power consumption was over 50 per cent, this figure covering many cars using old-style motors. For the safety-car alone this reduction is 60 per cent. Practically all of the companies report reduction of headway and increased service. Forty-one companies, including those operating in the larger cities, show increases in revenue—in some cases running as high as 35 per cent. Practically all of the companies show a decrease in accidents, especially boarding, alighting and platform. Most of the companies reporting are satisfied with the results obtained and advocate the extension of the safety-car service.

There is a factor, however, which may have an adverse effect on the general introduction of the safety car. That is the introduction of the zone system. There seems to be a tendency on the part of commissions in many states to favor a zone system of fare collection. If generally introduced throughout the country, it may make difficult the use the one-man car, especially in the larger cities having a number of zones. The operator of the safety car now has his hands full with the collection of a single fare, and I doubt very much if he would be able to attend in addition to the collection of zone fares. Nevertheless a number of the companies reporting use this car in connection with the zone system and collect fares by means of inspectors, the pay-as-you-leave plan or by stoppage of the car and collection at the zone limit. The fact, however, that any system of zone collection by the operator of a safety car would tend to slow up the speed to a great extent might make its operation under this system impracticable on heavy lines.

### SAFETY CARS SATISFACTORY IN KANSAS CITY

Safety cars have been used in Kansas City since April 27 with very satisfactory results. Twenty-five cars were bought with the idea of using them on a light-traffic crosstown line. It was later decided to put them in regular service through the congested district and give them a thorough trial so as to demonstrate once and for all whether or not this type of equipment would meet the extremely difficult operating conditions prevailing in Kansas City. Naturally the results are not entirely comprehensive, owing to the fact that the line could not be completely equipped with safety cars. The results obtained to date, however, are so gratifying that their extension to other lines in Kansas City may to some extent help solve present operating and financial problems.

The cars in Kansas City are being given a thorough trial on the Sunset Hill line. This line is 7 miles in length, serving the downtown district, the thickly populated residence district south to Forty-eighth Street, and from there on private right-of-way through the most exclusive residence portion of the city. In the downtown district the route is over Grand Avenue, which carries exceedingly heavy traffic with a headway on portions of it during the rush hour of from thirty to forty-five seconds. This line has the usual heavy grades to be found on all lines in Kansas City, and it was felt that if the safety cars could operate successfully over this line and maintain schedules headway in connection with the heavy equipment through the congested district, they could be placed anywhere.

Formerly on the Sunset Hill line during the rush hour twenty of the large cars were used, which gave approximately a four and a half minute headway. During the non-rush hours it was served by fifteen of the large cars, giving approximately an eight-minute headway. Beginning April 27 a rush-hour service was begun with fifteen of the safety cars and ten of the large ones, with between two and one-half and three minutes headway. During the non-rush hours fifteen safety cars give between a four and one-half and five-minute headway. Here are the results of this operation for the first two weeks as compared with the two weeks prior to the introduction of the safety cars:

| | |
|---|---|
| Car miles were increased | 47 per cent |
| Car hours were increased | 54 per cent |
| Gross receipts increased | 19 per cent |
| Expenses increased (only power and platform being considered) | 11 per cent |
| Net revenue gained | 25 per cent |

This revenue gain is at the rate of about $2,000 per year per car

Actual power-saving, running-time and stop tests were made on one of the safety cars on this line as compared with one of the large type. These tests gave the following results: The running time of the large car was forty-three minutes as compared to forty-four for the safety car. The time per stop in seconds for the large type was seven and seven-tenths as compared to ten seconds for the safety car. Stops per mile were seven, the same for both cars. The coasting percentage of the large car was 15.4 as against 24.1 for the safety car. The kilowatt-hour consumption per car-mile was 3.45 for the old type equipment and 1.39 for the safety car, showing a saving of 60 per cent. It will be seen from the foregoing that although the time consumed per stop for the safety car was 2.3 seconds longer, its running time was practically the same.

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*Abstract of paper before meeting of Missouri Association of Public Utilities, Excelsior Springs, June 6, 1919.

Twenty-five safety cars are now in operation in Kansas City, and five more are being built. When the line is completely equipped with safety cars, even should there be no further gain in gross receipts, the further reduction in operating expense will show a gain of $2,000 per car per annum, or a yearly net revenue gain for this one line of approximately $60,000. At this rate the cars would pay for themselves in less than three years.

Owing to the more frequent service it is interesting to note the gain in gross receipts on the Sunset Hill line as compared with the entire system. As compared with the same day of the preceding week, the first week's operation of the safety cars showed a 12 to 32 per cent gain in gross receipts for this line as compared to a 2 to 12 per cent gain in gross receipts on the entire system.

On the Messanie Street line in St. Joseph, where safety cars have been operated entirely since November, 1918, March of this year showed an increase of 26 per cent in gross revenue over March, 1918, and April of this year an increase of 23 per cent over the preceding year. The increase in car-hours and car-miles was approximately 10 per cent. Platform expense with two-man operation was $98 a day as compared to $65 per day with safety cars. The power saving would be anywhere from 50 to 60 per cent. These are very hopeful evidences of what may be expected by the general introduction of safety-car operation. Similar statistics might be quoted from every city in which these cars have been placed in service.

As for the car rider, there is not only rapid service with short headways but another feature which should lease him. The cars will carry with a fair degree f comfort a load of sixty, thirty-five seated and twentyve standing. In Kansas City we have adopted this s a maximum load, and when capacity is reached a Car Full" sign is displayed. Therefore a passenger nows beforehand what will be the maximum crowd mit. He knows that after the car has been filled it ill not stop to squeeze in a few more people, greatly his discomfort.

### FURTHER IMPROVEMENTS POSSIBLE

From the standpoint of construction there is a feelg on the part of some that the safety cars have been uilt up to date with standardization too strongly in e minds of the builders. The car is still subject to number of changes and refinements. It may have to strengthened in some of the essential particulars, hich may necessitate the addition of slightly more eight, or the use of better material.

It is likely that in increasing safety-car operation in ansas City, future cars will follow to some extent J. M. Bosenbury's compromise cars in Wichita, especially in regard to weight and slightly heavier construction throughout. These cars weigh 16,000 lb. and seat forty-one passengers. They are slightly larger than the present type, and in many essential points are built of heavier material.

The makers have also standardized on a width of 8 ft. In Kansas City the track centers will allow for the operation of more than a 9-ft. car. The reason advanced by the makers for adopting 8 ft. as standard is that there are many smaller cities in the United States which cannot take anything wider. This being the case, there is no reason why Kansas City and other cities should be penalized by the limitations of other places. Some additional width would greatly increase the riding qualities of the car, allow a wider seat and a wider aisle. It may be, therefore, that it will be necessary in the future to standardize on at least two widths of cars.

It will also be necessary to line the cars and put in a double floor in order to make it possible to heat them in the latitude of Kansas City. As now turned out without lining, it will be very difficult to heat the cars with any degree of comfort.

Owing to the light construction of safety cars, rigid inspection and proper maintenance will have to be insisted upon in order to keep them in good operating condition. Otherwise it will not take long under severe conditions to have the cars in the shops too great a proportion of the time.

In connection with these matters, I wish to quote from a letter by W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, which has just placed an order for 200 safety cars. In writing him I made some of the foregoing suggestions, and he replied as follows:

> I think all of your comments as to the light construction of the car, difficulty in heating and fear as to possible future heavy maintenance costs are well taken. We are making an effort to anticipate these features by strengthening and adding to the weight of the car, believing that some additional weight will be money well-expended in the long run. Yet it is my frank opinion that the use of a safety-car will more or less revolutionize the prevalent notions as to the method to pursue in building and repairing cars, and perhaps in the long run it will be found desirable to make them more like a Ford car, and in case of serious accident scrap the body or the complete unit if necessary.

Mr. Bosenbury, who designed the first cars, seems to think on the contrary that the present car is heavy enough and that the objections mentioned can be met by the use of better material. He says:

> With regard to the fear entertained that the extremely light construction of the car will result in an extraordinarily high maintenance cost after two or three years of operation, it is my belief that such fears are groundless. Instead of any weight being added to the car, the proposition resolves itself into an engineering problem of maintaining the present extreme light weight and even going to a lighter weight. If any greater strength is needed than that in the present car, it can easily be secured by using higher grade material for the main members of the car, such as dropper bars, sill angles and various other members of the frame. These can be made of pressings from vanadium steel, which will increase the strength of the car and also reduce the weight.
>
> The next thing to be considered in connection with reducing maintenance cost would be to use side girder plates made of American ingot iron instead of the ordinary tank steel now employed. This would result in preventing rust spots, which may possibly weaken the present sheets if not kept thoroughly painted.

Our engineers have made a number of minor criticisms. These are, it is true, but trifling. On the other hand, they have an important bearing from the standpoint of introducing a new type of equipment to the public. In viewing a radical departure from the ordinary type the public is naturally hypercritical, and little details, such as poor painting, etc., lead to adverse opinion.

The criticisms and suggestions above mentioned, however, are matters of construction detail which can and doubtless will be worked out as operators generally begin to dig into specifications for their own requirements. The fact remains that safety-car operation offers a financial solution for many of our problems. It provides the means for giving the public a better and more frequent service. It allows us to meet peak-load conditions and adjust non-rush service to non-rush income without penalizing the rider. It cuts down the expense of power and track maintenance. The general introduction of the little cars will practically solve the ever-present wage problem in that the wages of the operator can be increased to a point that will fairly well satisfy him without throwing the road into the hands of a receiver.

Everything points to the fact that this is to-day one of the livest propositions before electric railway operators of this country, and it merits earnest attention and thorough study. In addition to saving our "financial bacon," this type of equipment will allow us in both small and large cities to adapt transportation facilities to the public demand under all conditions. It gives us the means to provide the public with frequent service, which, after all, is the answer to the urban transportation question in every community.

## Short-Line Railroads Confer

### Resolution Adopted in Regard to Freight Contracts of Interurbans—Important Conference with Railroad Administration

MORE than 400 delegates of the American Short-Line Railroad Association, representing 600 short-line railroads throughout the United States, held a convention in Washington, D. C., on June 3, 4 and 5. Representatives of electric railways were present in connection with freight traffic matters.

The following resolution was presented to the committee on resolutions and adopted:

*Resolved*, That the following proviso of Section 1 of the act of March 21, 1918, providing for the federal control of railroads, should be repealed in the bill that will soon be considered by Congress making appropriations for the railroads under federal control, to-wit:

"*Provided*, however, that nothing in this paragraph shall be construed as including any street or interurban electric railway which has as its principal source of operating revenue urban, suburban or interurban passenger traffic, or sale of power, heat and light, or both."

*Resolved*, further, that any short-line railroad doing a general transportation business and connecting with or competing for traffic with a railroad under federal control shall be eligible to make a contract with the Director General of Railroads irrespective of the motive power used by said short-line railroad.

### BETTER TREATMENT FOR INTERURBANS

At a conference held on June 4 with Messrs. Thelen and Niles of the United States Railroad Administration, a request was made in behalf of electric lines for the same consideration from the steam railroad lines under government control as is being accorded the short-line steam railroads, through contracts being executed between the short lines and the lines under control. The members of the presentation committee present were Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; Dana Stevens, vice-president Ohio Electric Railway, Springfield, Ohio, representing W. K. Schoepf; Edwin C. Faber, vice-president and general manager Aurora, Elgin & Chicago Railroad, Aurora, Ill.; and C. E. Thompson, assistant to president Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., who represented Britton I. Budd.

Other electric railway men present were George Theis, Jr., president, and Chester I. Long, general attorney, and Fred C. Mayer, traffic manager, Arkansas Valley Interurban Railway, Wichita, Kan.

Among the subjects considered at the conference were the following:

1. Proper divisions of traffic.
2. Reimbursement on account of freight and express business diverted because of government control of trunk lines and express companies.
3. Physical connections of electric lines with steam lines where proper.
4. Exchange of transportation as per I. C. C. regulations.
5. Two days free allowance to electric lines receiving steam line cars for loading or unloading.
6. Through rates and traffic relations, and a general co-ordination of electric and steam line facilities for the benefit of the companies and the public, the latter being entitled to improved transportation service, wherever possible, by such co-ordination. Whether formal contracts with the Railroad Administration should be entered into is a question to be considered. The Arkansas Valley Interurban Railway has already made application for such a contract and has joined the American Short Line Railroad Association.

The fact that some of the steam roads under government control have shown a disposition to co-operate with the electric lines, while others have not, would seem, it was said, to indicate the desirability of a uniform policy of co-operation. This it might be possible to establish under a general order of the Director of Public Service of the United States Railroad Administration.

The establishment of the principle of recognition of the interurban railways by the steam railroads, it was felt, is a matter of importance to all such electric carriers. It might be possible now, while the steam railroads are within government control, to have a principle adopted that would be of value to the interurbans generally in the future, for passenger as well as freight traffic.

## New Patents Granted for Catenary Suspensions

Several new patents relating to overhead line material are referred to in *Elektrotechnik und Maschinenbau* of Jan. 5. A patent granted to the Allgemeine Elektrizitäts Gesellschaft provides methods of suspending two catenaries over a track when heavy current renders two wires desirable. These are hung in such a manner that the wires can be independently moved sideways. An Austrian patent granted to the Siemens-Schuckert Works provides for automatically adjusting the tension in the overhead conductor caused by variations of temperature.

Other patents referred to provide methods of suspending the overhead catenaries for two parallel tracks, method of hanging wires and special section insulators and a method of taking current from fixed overhead points by means of a wire stretched along the length of the train above the roof.

# New York Association Gets Down to Fundamentals

### At Annual Meeting, Held at Lake George, the Local Fare Situation Was Considered in Detail—E. A. Maher, Jr., Was Elected President

THE thirty-seventh annual meeting of the New York Electric Railway Association was held at the Fort William Henry Hotel, Lake George, on June 7, with 150 or more persons in atendance. The morning was devoted to the president's address, reports of committees, discussion of the fare situation and the presentation of a paper on "Workmen's Compensation from the Self-Insurer's Standpoint" by O. G. Brown. In the afternoon there were various sports and other entertainment, and in the evening a very successful banquet.

#### A SHEAF OF INTERESTING COMMITTEE REPORTS

After the reading by President H. B. Weatherwax, Schenectady Railway, of his presidential address (abstracted elsewhere in this issue), the secretary-reasurer, William F. Stanton, New York State Railways, Rochester, read the report of the executive ommittee and his own report. These showed that the ctivities of the association for the past year had been irected largely to the bettering of the financial condiion of the companies throughout the State. The usual uarterly meetings were omitted in the interest of conomy. The receipts during the year have been 6,064.39 and the expenses $5,719.48, the surplus increasing the balance from $6,612.33 to $6,957.24 during he year. Of the assets $3,000 is invested in Liberty onds.

MEMBERS AND GUESTS OF NEW YORK ELECTRIC RAILWAY ASSOCIATION ASSEMBLED IN CONVENTION AT FORT WILLIAM HENRY HOTEL, LAKE GEORGE

The committee on ways and means to produce addiional revenue, reported that a meeting of the associaion had been called on April 29, 1918, to present the hen fare situation in the State. The Court of Appeals had denied the jurisdiction of the Public Service Comissions over rates named in franchises, and the egislature had failed to enact legislation prepared by the committee looking toward the correction of the condition thus brought about. It was decided therefore that the effort to secure relief should be continued.

The bill known as the Carson-Martin bill was introduced in the 1919 Legislature, giving the Public Service Commissions the jurisdiction in fare cases which the Court of Appeals in the Quinby decision had declared to be lacking. This measure received considerable support and passed the Assembly but failed of passage in the Senate. Shortly after the adjournment of the Legislature the committee requested the Governor to appoint a commission of citizens to make a study of the traction situation and report to him its recommendations for remedial measures. To this the Governor replied that the public service commissions are already organized to make such recommendations and suggested that the committee appeal to them. This has since been done.

Among other matters the committee reported that the publicity campaign directed by Ivy L. Lee has been continued in curtailed form; that it had recommended through the association the intervention in the Buffalo case before the Court of Appeals of companies in other cities situated like the International Traction Company; that all electric railways in the State should join in a motion for the rehearing of the Quinby case; and that the efforts of the committee to co-operate with the Conference of Mayors and Other City Officials of New York State in recommending legislation concerning utilities had not been fruitful, due to the decision of the committee of the conference appointed to draft a bill to permit municipal ownership of utilities not to broaden its scope to include other legislation.

The committee summarized the fare situation by stating that six cities in the State are now collecting a

7-cent fare and twenty-one cities a 6-cent fare. It was necessary that sixteen cities waive franchise grant restrictions to permit fare increases.

In conclusion the committee recorded its sorrow and sense of loss in the death of Horace E. Andrews and stated that T. C. Cherry, Syracuse, had been appointed to succeed him.

For the committee on military operations, James P. Barnes, Schenectady Railway, reported that up to the time of the armistice no call had come from the adjutant-general in response to the association's offer of its services. The plans for the use of electric lines in the mobilization of troops had been deferred until the adjutant-general worked out a detailed arrangement, and consequently the year 1918 was simply one of watchful waiting for the committee. Mr. Barnes recommended that the committee now be discharged.

The committee on classification of accounts reported by J. C. Collins, chairman, that a conference was held in Albany on June 25, 1918, and a plan was adopted for presenting to the Public Service Commission the views of the association regarding the proposed classification. At a subsequent hearing papers were read and verbal arguments were presented in support of these views. As a result the commission so modified the classification as practically to meet the wishes of the association.

### STANDARDIZATION OF SMALL AND LARGE CARS

The report of the committee on standards, submitted by W. G. Gove, Brooklyn, suggested the possibility of embodying standardization principles in car construction with special reference to the so-called "safety car." And aside from the application and use of the safety car it would seem that the principles laid down by the committee of the Electric Railway War Board could be applied in establishing a relation between the safety car and a larger type of prepayment car that would make possible the use of many parts in common. These could include axles, motors and truck parts. With safety cars two motors could be used and with the larger cars, four motors.

The committee advocated the use of the safety car wherever possible and stated that there are inquiries outstanding from electric railways within the State for 750 cars of this type, much of which business will be closed within a month.

The committee on membership, James F. Hamilton, chairman, reported three new members and four withdrawals, the latter including an enemy concern whose business was discontinued by our government. There are now thirty-four active, nine associate and eighty-eight allied members.

### A SYMPOSIUM ON THE FARE SITUATION

Two main topics were set for discussion, the fare situation in New York and self-insurance. In the absence of the scheduled speaker on the first topic, Morris Cohn, Jr., Niagara Falls, N. Y., various phases of the fare situation were covered by Harlow C. Clark, editor *Aera;* Mr. Barnes; A. W. Loasby, president First Trust & Deposit Company, Syracuse, N. Y., and J. E. MacLean, attorney United Traction Company, Albany, N. Y.

Mr. Clark stated that fifty-five of New York's fifty-six cities have local electric railway service, but that in thirty-three cases franchise restrictions prevented an increase in fare without the consent of the municipal authorities. Nevertheless sixteen fare increases have been made with city consent, and eighteen in cases where such consent was not required, or a total of thirty-four increases. The commissions have not refused increases where they had jurisdiction, but four cities have refused their consent. Seven applications for higher fares are still pending, and in nine cases no application has been made.

Among the thirty-four cities now having increased fares, there are six where a 7-cent fare is in effect; twenty-one, a 6-cent fare, and one a 6-cent fare on all but one line. Three companies now have zones outside of city limits; one has a suburban fare increase and two have secured the abolition of reduced-rate tickets.

Mr. Clark said that the authorities in New York lack a real understanding of the proper theory of rate control. The Carson-Martin bill to give the commissions control over franchise rates aroused opposition among high officials favoring city home-rule, but the service-at-cost plan recently proposed for Buffalo was vetoed by the Governor on the ground that it constituted an undesirable abridgement of state control over rates. The State of New York has either gone too far with commission regulation or not far enough, and the situation must be remedied. The first step to be taken is to make the people understand utility conditions, and to this end all investigations, such as those of the Chamber of Commerce of the United States, the Federal Electric Railways Commission and other bodies, will be helpful. In closing, Mr. Clark strongly urged that the car rider be informed as to what are proper charges against him in the cost of service, so that he will become the ally of the railway and thus insure public co-operation in the settlement of railway problems.

Mr. Barnes described the rate case of the Schnectady Railway, involving one city and three interurban divisions. In his opinion, the theory should be definitely established that the earnings and expenses of interurban cars within city limits should not be included in the accounts of the city lines but, because of the different type of operation, be carried into the interurban accounts.

In its case before the commission the Schenectady Railway urged that the three interurban lines be considered as one system, but the commission decided to consider them separately. It found the rate on the Albany division compensatory, but it increased the zone rates on the Troy and Saratoga divisions from 5 to 6 cents, at the same time permitting a 6-cent city fare in Schenectady. The interurban increases involved a novel point in that the charge for one zone was put at 7 cents with 6 cents a zone for rides of more than one zone so as not to burden the passenger who rides a short distance past a zone limit.

A glimpse at former days, when electric railway securities were regarded as safe investments because "people must ride," was given by Mr. Loasby, who said that his interest in the traction situation began twelve years ago with the organization of an investment department in his company. The investment situation today is different, he remarked, because it is almost impossible for an electric railway even to get bank support for current loans unless the bank is already involved.

Mr. Loasby declared, however, that he is an optimist. In his opinion the industry has passed through the worst of its troubles. Nevertheless he suggested that the industry drop its policy of secrecy and fight through persistent publicity for just treatment. Less talk should be had about a specific 6-cent, 7-cent or any other fare, and more about an equitable agreement between each company and city. It would even be well to allow the public to be represented on company directorates. Mr. Loasby said that the bankers in New York are planning to aid the industry by enlisting the support of electric railway security holders.

Mr. MacLean, in connection with the Buffalo situation, explained that the Milburn agreement with its -cent fare restriction contained a clause stating that he contract between the city and the company was not effective until ratified by an act of the Legislature. In 892 the agreement was submitted to the Legislature nd ratified by a special act. It is now asserted by the nternational Railway that the stipulated 5-cent rate is ot a franchise rate but a statutory rate and that the ublic Service Commission for the Second District of ew York can increase it.

The question whether the commission has jurisdiction and power, under the facts shown, to regulate fares in Buffalo is now before the Court of Appeals for final decision.

[The case is of more than local interest, for it involves the Quinby case in Rochester, whereby it was held that the Legislature had not clearly given to the commission any power it possessed over franchise rates, and the later South Glens Falls decision, in which it was held that under the regulatory law the commission has power to increase gas rates over those stipulated in grants of location. The inter-relationship of these cases was noted in the ELECTRIC RAILWAY JOURNAL of May 24, 1919, page 1027—EDITORS.]

At a hearing in the Buffalo case on June 6 before the Court of Appeals, the Schenectady Railway, the United Traction Company and the New York Railways intervened, said Mr. MacLean, in an endeavor to rectify what many considered was a mistaken decision in the Quinby case. A motion for the reargument of this case had been seriously considered, and it had been agreed that an application would be made, the New York Railways having prepared a comprehensive brief and motion papers. When the Buffalo case, however, reached the Court of Appeals, it was decided that the brief would be used in intervention. The brief is now before the court, and it is hoped that the Buffalo decision may constitute a reversal of the Quinby case without reargument. The International Railway attorneys have asked that the court, if it does not hold the Buffalo and Quinby cases to be different, reconsider the decision made in the Quinby case.

Mr. MacLean stated that he had no sympathy with the idea of going to municipalities for relief, because years of experience in coaxing, wheedling and forcing had shown that more than half-relief could not be secured from city authorities. He firmly believed that more power should be placed in the hands of the commissions in New York, and also that the law should be changed so as to enable them to clear up the matter of transfer charges.

### COLLATERAL FOR SELF-INSURANCE

The paper on self-insurance in connection with workmen's compensation laws, by O. G. Brown, assistant secretary of the Self-Insurers' Association, is abstracted elsewhere. Supplementing his remarks, Mr. Brown said that under plans now under consideration by the State Industrial Commission every self-insurer in New York State will probably be asked to readjust upward the securities deposited as collateral against compensation awards. The first proposal of the commission (which, for example, would raise the self-insurer's security deposit from an amount equal to a six months' premium in the state fund to a three-years' premium) would prove a great and unnecessary hardship to many companies and prevent them from becoming self-insurers and thus carrying insurance at actual cost. A compromise plan was recently presented to the commission whereby a self-insurer would furnish as a guarantee securities equaling a six-months' premium in the state fund and at every six-month or yearly period thereafter readjust the deposit according to the liabilities incurred, the deposit being increased when the liabilities amounted to one-half of it.

The committee on resolutions then presented the following, which was unanimously adopted:

> The New York Electric Railway Association records with the deepest sorrow and regret the death of Horace Ellsworth Andrews.
>
> Mr. Andrews was a pioneer in the electric railway industry. His contributions to its development were of the greatest permanent value, and largely to him central New York owes the conception and fulfillment of its largest traction system.
>
> His qualities of integrity, courtesy and kindliness endeared him to all with whom he was brought in contact, and especially to his fellow members in this organization.
>
> *Be it Resolved*, that this memorial be adopted by the association, to be spread upon its minutes and that the secretary be instructed to transmit a copy thereof to Mr. Andrews' family.

Upon the report of the nominating committee, the following officers were elected for the ensuing year: President, E. A. Maher, Jr., vice-president and general manager Third Avenue Railway, New York; first vice-president, T. C. Cherry, vice-president Peck, Shannahan & Cherry, Inc., Syracuse; second vice-president, W. O. Wood, president New York & Queens County Railway, New York; and secretary-treasurer, W. F. Stanton, assistant to president New York State Railways, Rochester. The new executive committee consists of B. E. Tilton, general manager New York State Railway, Syracuse; W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, New York; J. E. Hewes, general manager Albany Southern Railroad, Albany, and George Keegan, assistant to vice-president and general manager Interborough Rapid Transit Company, New York.

Mr. Maher, upon taking the chair, expressed the thanks of the association for the work accomplished by Mr. Weatherwax during the past year. Continuing, he said that he did not look for improved conditions in connnection with labor and material prices. The impossibility of increasing production by the introduction of such improved methods and means as followed the Civil War, the large demands for goods in many lines and the unprecedented expansion of credit all point to the certainty that there should be no present hope of decreased costs.

In regard to labor, Mr. Maher said that he did not think wages ought to be reduced, and he hoped that they would never have to be. The cost of living has gone up, and the men are entitled to a living wage. Increased receipts, however, must come to the railways if this hope of continued wages is to be realized.

In Mr. Maher's opinion, two remedies for the present critical situation of electric railways should be sought

—(1) a decrease of expenses through the adoption of every practicable means for operating economy and the abolition of unnecessary mileage, and (2) an increase in receipts. The railways should get away from the idea of a fixed fare of any amount and endeavor by every honest means to bring to rate-fixing bodies a true realization of the condition of the industry and the necessity for an open and unprejudiced consideration of an equitable system of rate-making.

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## The Social Side of the Convention

THE day of the convention was an ideal one to be spent at a lake resort. It was warm but there was a pleasant breeze from the lake, and all of the outdoor sports which had been planned could be carried out. The chief events of the afternoon were a baseball game between the railway men and the supply men in the first part of the afternoon, and a golf tournament at the links of the Glens Falls Country Club. During these athletic events the ladies had an opportunity to participate in an auction bridge contest. Others among the delegates took trips on the lake or explored the historic points around Fort William Henry, of which there are many.

In the evening the annual banquet was held. President Weatherwax acted as toastmaster. The speakers were Brig-Gen. Frank T. Hines, chief of Transportation Service, War Department, Washington, D. C., Frank Buffington Vrooman, Ph.D. and Hon. Job Hedges, receiver New York Railways. General Hines gave an account of the methods employed by the government in collecting its army of 2,000,000 and shipping them to France, a work of great magnitude. Doctor Vrooman discussed the Bolshevik movement, the League of Nations and other topics. Mr. Hedges introduced his remarks with the statement that he had now learned that the duty of a receiver of a railway company was to stand at the end of a line and receive anything which all the others in the line let pass by. He then took up many topics of the day in an address which brought great applause.

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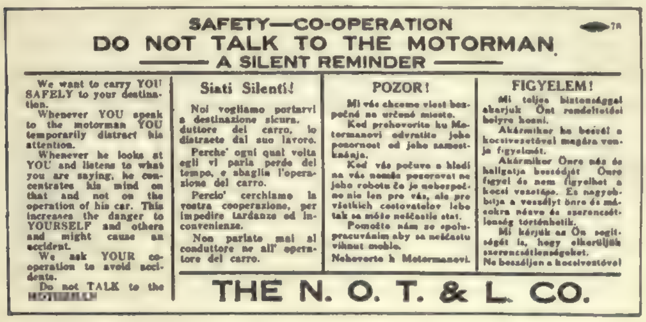
## Keep Mum

THE Northern Ohio Traction & Light Company supplies its motormen with cards similar to that reproduced. On one side is an injunction to silence, in four languages. On the other side is a cartoon, illustrating the evil effects of collision which occurred because a passenger talked with a motorman.



SAFETY—CO-OPERATION
DO NOT TALK TO THE MOTORMAN
A SILENT REMINDER

We want to carry YOU SAFELY to your destination.

Whenever YOU speak to the motorman YOU temporarily distract his attention.

Whenever he looks at YOU and listens to what you are saying, he concentrates his mind on that and not on the operation of his car. This increases the danger to YOURSELF and others and might cause an accident.

We ask YOUR co-operation to avoid accidents.

Do not TALK to the [illegible]

**Siati Silenti!**

Noi vogliamo portarvi a destinazione sicura. duttore del carro, lo distraete dal suo lavoro.

Perche' ogni qual volta egli vi parla perde del tempo, e sbaglia l'operazione del carro.

Percio' cerchiamo la vostra cooperazione, per impedire tardanze ed inconvenienze.

Non parlate mai al conduttore ne all' operatore del carro.

**POZOR!**

Mi vás chceme viest bezpečné na určené miesto.

Keď prehovoríte ku Motormanovi odvratite jeho pozornost od jeho zamestkánja.

Keď vás počuve a hledí na vás nemôže pozorovat na jeho robotu čo je nebezpečne nie len pre vás, ale pre všetkich cestovatelov lebo tak sa môže nešćastie stat.

Pomožte nám so spolupracuvánim aby sa nešćastu vihnut mohlo.

Nehovorte k Motormanovi.

**FIGYELEM!**

Mi teljes biztonsággal akarjuk Önt rendeltetési helyre hozni.

Akármikor ha beszél a kocsivezetővel magára vonja figyelmét.

Akármikor Önre néz és hallgatja beszédjét Önre figyel és nem figyelhet a kocsi vezetésre. Es nagyobbítja a veszélyt önre és másokra nézve és szerencsétlenség történhetik.

Mi kérjük az Ön segítségét is, hogy elkerüljük szerencsétlenségeket.

Ne beszéljen a kocsivezetővel

THE N. O. T. & L. CO.

THIS CARD SAYS "DON'T TALK," IN FOUR LANGUAGES

Copies of this card are being issued to railway members of the National Safety Council by H. B. Adams, chairman of the Electric Railway Section, together with other suggestions for safety.

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# Self-Insurance for Workmen's Compensation*

### Self-Insurance Is Valuable to Both Employer an Employee and Should Not Be Prevented by Requirement of Excessive Guarantees

BY O. G. BROWNE
Assistant Secretary of Self-Insurers' Association, New York, N. Y

WHEN compensation laws were established, th principle of negligence was abolished and compensation was predicated on the disability itself, and, fo the most part, periodical payments. Inasmuch as thes payments necessarily were spread over a long term o years, especially in the cases of serious injury or death, new principle was brought into being—that of securit for the payments. It has been argued that there wa no guarantee given other creditors for the protectio of their accounts and therefore there was no justification for exacting such a guarantee in the case of obligations to pay compensation to injured workmen and thei dependents. This is answered by the statement tha the very object of compensation laws is to preven workmen from becoming wards of the state, and thi purpose would in many cases be defeated if these payments were not secured.

This has been and still is the most troublesome question in the administration of compensation laws.. It i mainly responsible for the absolute state monopoly existing now in five states, and it is the cause of the frequent attempts to create a monopolistic state fund i other states. While this menace to the right of employers has existed for some time, it has been accentuated b the spirit of unrest which has followed the war. It wa one of the policies adopted by the American Federatio of Labor a year or so ago and serious efforts were mad to put the program through in a number of the state during the past winter. Whether or not workmen an their dependents will be any happier and have an greater security under a state monopoly is doubtful.

### SELF-INSURANCE GENERALLY PERMITTED

Of the forty-one states and four territories havin compensation laws, self-insurance in some form is permitted in all but eight. Of these as heretofore state five have a state monopoly, and some of those have elective laws so that one may carry his risk and no operate under the law if he chooses.

But New York State and all the states contiguou to it, except Massachusetts, permit self-insurance i one form or another. In Massachusetts one may operat under the schedule of the compensation act and fail t comply with its administrative requirements, which i the plan followed by a large number of employers. Th question of security by self-insured employers is not serious one in Pennsylvania, New Jersey, Connecticu or Vermont. Usually the authorities will accept the annual statement of a solvent employer and grant hi the right to carry his own risk. The theory underlyin this is that the employer's good will, prospective ea ings and valuable plant are sufficient security to guarantee the payments he may be called on to make.

In New York, however, there is an entirely differen problem. The law says the State Industrial Commissio "may" exact the furnishing of securities as a guarantee. The commission has interpreted this to mean tha it "must" exact them. And there is justice in this contention. The law is compulsory to the extent of its coverage. Payments must be made, even in the case of specific injuries, for years, and in death cases for the life of the widow. A widow twenty-one years of age has an expectancy of forty-one years. An extreme case, such as a widow thirty-six years of age with six children, aged twelve, ten, seven, four, and twins two years, respectively, where decedent earned $100 a month or better, would mean that payments might aggregate the sum of $18,000 and be spread over a long term of years, although commuted this would amount to but about $11,000. As these liabilities grow they would in a few years amount to very large obligations, and on however sound a financial basis an industry may be now, no one can say what its condition might be five years hence. The commission is charged with the duty of exercising a wise discretion is exacting security for these payments, and it manifestly would not do its full duty if it did not require something tangible as a guarantee.

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*Abstract of paper read before the New York Electric Railwa Association, Lake George, June 7, 1919.

In New York provides four distinct methods of providing security for these payments—liability insurance, mutual insurance, state-fund insurance and self-insurance. The laws respecting the first three forms of coverage are specific enough so that they are not a problem, and it is self-insurance which has recently concerned the commission. This concern has not been brought about by any failure on the part of self-insurers to meet their obligations. Even those concerns which are in receivers' hands have all met their obligations and have security provided for their outstanding liabilities. This is more than can be said for the liability insurance companies, of which one has not met its liabilities and another, I understand, raised considerable doubt. Rather has the concern felt by the commission been brought about by the unrest and some political philandering.

### GUARANTEES TO BE READJUSTED UPWARD

For a long time the commission has used as a basis for determining the amount of securities it would require deposited as a guarantee, an amount equal to what would be required to purchase six months' insurance in the state fund. While as to small risks, this was not in the main unreasonable, it was as to large risks, for this premium, it must be borne in mind, is based on payroll expenditures in the risk considered but has a rather heavy loading for administration expense. It has been the contention of self-insurers that the amount of securities exacted should nearer approximate the actual hazard of the risk covered, by taking the experience as a basis, adding a reasonable amount for cost of catastrophe, increasing the amount as the liabilities grow, and receiving credit for the liabilities that terminate. It has been variously estimated that this would bring the peak in the amount of securities furnished in from eight to twenty years, although the best thought is that because of remarriages, deaths or continued payments, the average peak will be reached in ten years.

Moreover it has been urged that in determining the amount of securities, the commission should consider two very important things, one the value of the plant of the industry to be secured and the other the fact that under Section 34 of the law compensation payments are entitled to the same preference over other creditors, in the case of a bankrupt industry, as are unpaid wages. Where there is no great hazard in the industry, such that the plant may be wiped out, which we know as the catastrophe hazard, there should be little apprehension that compensation would not be paid even if no securities were required. This latter proposition should and does appeal particularly to electric railways. It has been stated that it is impossible for such a company to kill more than three employees at one time. One of the largest electric railway organizations in New York recently surveyed its activities to get an idea of what, if any, catastrophe hazard it had and found that the largest number of men exposed to a single hazard was the operation of a work car containing eleven men.

This problem is still under discussion with the State Industrial Commission. It is disposed to be reasonable, but apparently it is determined that all self-insurers shall readjust upward the amount of securities they have to deposit. The chief concern of electric railways is to obtain recognition of the principles outlined above.

# Electric Railways Hard Hit by War*

### The Author Quotes Data to Show That This Industry Has Maintained Service Under Conditions Far from Equitable

BY HARRY B. WEATHERWAX
Vice-President United Traction Company, Albany, N. Y.

THE plight of the electric railway industry, hitherto a purely local question, has become a national problem of the gravest character. Of all the nation's industries, ours has emerged from the war in the least satisfactory condition. To-day electric railways representing more than one-tenth of the total mileage of the country are in the hands of receivers, with an additional mileage threatened with bankruptcy unless speedy relief is obtained. During the past year more than 750 miles of track have actually been abandoned. No other industry during the war period has sacrificed so much for the public service.

The whole situation is of such a nature that it is actually the personal concern of every man, woman and child in the country who rides on a street car. For many years the public has been educated more in the sins than the virtues of the greatest public service corporations. One has had only to cry "Watered Stock!" to defeat the most honest and businesslike attempts on the part of electric railway managers to relieve an ailing corporation of its burdens and improve its service. The problem of the public utility corporations to-day has nothing to do with watered stock or any other financial or managerial sin of the past. The task of the hour is an extremely simple one, lending itself to no prejudice or demagogism; it is primarily to secure enough revenue to enable us to meet our operating expenses. We can hardly even think in terms of a return upon the capital invested.

### SOME HIGHLY CONVINCING DATA

The following concrete facts should convince anyone whose mind is open on the subject of the almost hopeless condition in which we find ourselves, and the situation is daily growing more alarming: During 1913, tax payments averaged about 5.8 cents on each dollar collected in street car fares, while during the year 1918, the companies returned to the public in taxes about 9 cents out of each dollar collected, an increase of about 55 per cent. In 1913, about 51 cents out of each dollar collected in trolley fares was paid out by the companies in wages to their employees, while during 1918 the companies so paid out about 70 cents out of each dollar, an increase of about 37 per cent. In 1913 there was expended in the settlement of accident and injury claims about 5 cents out of each dollar, and the companies have been successful in holding this fairly well to that figure in 1918.

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*Abstract of presidential address delivered at Thirty-seventh Annual Meeting, New York Electric Railway Association, Lake George, June 7, 1919.

We find, then, about 16 cents left out of each dollar collected in street car fares with which to buy materials and supplies for the operation of the properties for the public needs, and last year there was spent about 19 cents, or 3 cents more than was earned.

In the last report of the Public Service Commission, Second District, State of New York, some startling comments on the subject appeared, a few of which were as follows: During 1917 six roads were sold under foreclosure; the funded debt of the companies coming within the jurisdiction of that commission increased in 1917 about 59 per cent over 1910; there was an increase of about 19 per cent in 1917 over 1910 in the money outlay invested in construction and equipment; the corporate surplus decreased from $3,334,310 in 1910 to a deficit in 1917 of $6,717,517, a reduction of over $10,000,000, or 301.4 per cent; maintenance of way expenses increased about 52 per cent; maintenance of equipment, 71.4 per cent; power expenses, 41 per cent. Then we come to the increase in the wages paid to conductors, motormen and other trainmen, which amounted to nearly $2,500,000, or about 53 per cent, and this figure covers only the increase in 1917 over 1910. We all know what the War Labor Board did with this item in 1918.

Then the commission makes this significant comment on the situation as a whole:

> A wave of business depression struck this country during the latter part of the year 1914 and extended far into the year 1915. The foregoing statements show a healthy and continuous increase in the operating revenue of these railroad companies with the exception of the year 1915, when there was a decrease compared with the preceding year. The revenue under this classification for the year 1917 was $36,155,000. Notwithstanding the decrease in the year 1915, this was an increase over the year 1910 of $11,238,000, or 45.1 per cent. As far as operating revenue alone is concerned, these figures show a prosperous condition which continued through 1918 up to October, after which it was unfavorably affected by the influenza epidemic. . . . While the financial condition of electric railroad corporations Dec. 31, 1917, was serious, it has become more so during the year 1918 by reason of conditions growing out of the war. The causes of a rapid and serious impairment of the net incomes of these companies were not to any great extent attributable to falling off in number of passengers carried except in the latter part of the year 1918, when it was adversely affected by the prevailing epidemic of influenza, but were due almost entirely to increased operating expenses. The above statements do not show all of the increases in operating expenses which during the year 1918 far exceeded those of any other year in the history of these companies. In addition to the advanced cost of materials, wages were substantially increased by order of the National War Labor Board. The conditions outlined above show that the public as well as the companies are facing a serious condition in the matter of electric railroad transportation. The well-being of the different communities is to a great extent dependent upon proper street-car service. The first step necessary to relief for all interested, which includes the public as well as the companies, is a thorough understanding of existing conditions on the part of all concerned. It is a case where criticism, agita tion, or legislation directed only to censure will not avai nor will it relieve the situation. Whether the net incom should be increased by a reduction in fixed charges, de creased operating expenses, increased rate of fare, charg for transfer, or limitations of service, can be determine only after full and careful examination of all the condi tions affecting each individual corporation.

The above is a well-placed and directly pointe warning, coming as it does from one of the branche of our State government, and, unfortunately, it was bu lightly received by the public.

### "QUINBY CASE" DECISION A BIG SET-BACK

During the war the traction companies were groun between the millstones of the War Industries Boar and the War Labor Board. It was the necessary dut of the former, for many reasons, to maintain stabl prices, and as a consequence everything entering int street railway construction and operation went up a the rate of which you are all familiar. The War Labo Board increased the wages of street railway employee at the rate of $125,000,000 a year. The companies i the meantime were chained down by franchises, munic ipal governments and local commissions, and wer unable, as a class, to increase their fares to meet thei expenses. The assistance afforded the companies by th government was meager. The terms of the law creatin the War Finance Corporation were such that but comparatively few railways were able to avail them selves of its provisions, since ample security such a few of the companies possessed, was required as a con dition of loans.

It was obvious that the recourse of electric railways so confronted with enormously increased expenses, wa either an increase in the price of their service or reduction in the amount of the service furnished for th prevailing price. This was the policy of every othe industry affected by like conditions, as is evidenced b the increased price of practically everything that i sold on the market. It was, however, impossible for th electric railway companies to solve their problem in thi simple manner in this State, due to the attitude of loca and State politicians, who, since the decision in th Quinby case, have repeatedly failed in their duty t both the companies and the public. Some of the ver communities to-day who are most bitterly opposin and assailing those properties, have been establishe and given their very existence by the accommodation afforded by those properties. The great Empire Stat is practically the last state to take action toward restor ing the lost credit of its street railways.

### POLITICS IS A LARGE FACTOR IN RAILWAY TROUBLE

The national government, which assumed the right t increase the cost of operations, absolved itself of an responsibility as to the furnishing of revenue wit which to meet the increase. The companies were them selves without power, which lay either with Stat regulating commissions or with the local authorities the communities in which the companies operated. Th commissions, where they have had full authority to dea with the situation, have tried to do their duty, but i cases where jurisdiction has rested with the city author ities alone the situation has been very discouraging As a matter of fact, fare regulation by local authoritie is usually a matter of politics. Street car service and street car fares form a favorite and convenient issue fo e politician, and this has been thoroughly illustrated Schenectady, where a year ago this month the employees of the Schenectady Railway went out on strike r higher wages, demanding an increase of 10 cents r hour, a sum which the financial condition of the mpany would not permit it to grant. However, the atter was finally settled and one of the conditions the settlement was that the case was to go to the ational War Labor Board and at the same time the ty officials agreed in writing that if the National ar Labor Board increased the wages of the men, the mmon Council of the city would change the conditions the franchise containing a limitation in the fare to e cents, so as to permit the company to take the se to the Public Service Commission to have it judicated upon its merits, provided that a firm of countants hired by the city, after looking into the mpany's financial condition, decided that it could not y the wages based on the award at the then existing tes of fare. The National War Labor Board two onths later made an award, increasing the rate of y to the employees by 15 cents per hour. It was t until eleven months later, however, that the Comon Council was prevailed upon to carry out its obligaon, although the firm of public accountants hired by e city reported that an increase in the fare was necesry. The delay cost this comparatively small company ore than $200,000 in gross revenue. New York City another shining example of how politics can ruin ese properties.

Government or municipal ownership is being urged many as a panacea, but it should be borne in mind at this will not remove the real problem, which is e of more revenue. Municipal ownership would only ansfer the burden to other shoulders, not remove it. e whole situation could have been very much clarified the scheme of regulation by commission in this ate, which has been as we all supposed for the last cade fully in the commissions' hands, had been comted by the passage by the Legislature of a bill known the Carson-Martin Bill, which was introduced early ring the term of the last session of our Legislature. e passage of this bill would have taken the rate estion out of the hands of local politicians and placed where it belongs.

## ood Advice to Men Who Must Constantly Be On Their Feet

LECTRIC railway men, both on the platform and in the shop or power house, are almost constantly their feet. A poster from the health service section the National Safety Council on the subject of lat Feet" should be helpful to many of them. The ster states that so-called "rheumatism" in the ankles the arch of the foot, or pains in any part of the leg low the knee may be due to this cause. Such sympms should cause a man to consult his physician early. As mitigative measures the following are recomnded: (a) Walking with the feet parallel to each er and standing with the toes turned in, to throw weight on the outer edge of the foot and relieve the dency to flat-footedness; (b) wearing heavy-soled es with stiff insteps to protect relaxed arches, or ustable leather arch supports for fallen arches; (c) hing, sleeping and avoiding excessive fatigue, to part tone to the muscles and strength to the tendons t support the arches.

## Safety Car Discussed

### Conclusions of Westinghouse Representatives, Car Builders and Operators Summarized Under Twelve Heads

THE annual meeting of Westinghouse electric railway representatives was held this year at the home of the Birney Safety Car, St. Louis, Mo. The purpose of these meetings is to discuss and exchange ideas in the matter of rendering greater assistance to the electric railway industry and the development and improvement of apparatus and service to the railway operators—its customers.

There were forty-one Westinghouse electric railway representatives at the meeting. The majority of these were from district offices in all parts of the country. The Safety Car Devices Company had ten representatives. With the car builders and railway operators who were present there was a total of approximately sixty attending the meetings.

The first two days, June 2 and 3, were devoted to "talks" and discussions on the safety car. On account of the limited time, evening meetings were also held. F. A. Richards, sales manager American Car Company, and his assistants described the detail design of their standard Birney Safety Car and outlined the plans of the J. G. Brill Company for expanding its already large facilities to meet the rapidly growing demand for Birney Safety Cars.

George Tontrup, president National Safety Car & Equipment Company, and his assistants explained what his company was doing; also their plans for the future safety cars.

E. B. Meissner, vice president St. Louis Car Company, gave a similar talk. All the car builders were pronounced in their optimism on the future of the safety car in electric railway service.

J. M. Bosenbury, superintendent of Equipment Illinois Traction System, gave a very instructive talk on the results secured up to date on the Illinois Traction System with safety cars. This company recently ordered a large number of additional cars from the American Car Company.

C. O. Birney, Stone & Webster, held the attention and interest of the meeting with a very clear survey of the street railway situation and demonstrated that the safety cars had solved the problems wherever they were operated and properly equipped as the designers have planned.

F. G. Buffe, Kansas City Railways, gave a most optimistic and inspiring talk on the railway operating situation in general. According to Mr. Buffe, the safety car is the solution of most operating problems. His company is planning for its general use.

W. S. Rugg, manager railway department Westinghouse Electric & Manufacturing Company, Mr. Cass, manager Safety Car Devices Company, Carl Beck of the same company and several others gave brief talks on the safety car and its application.

A summary of the points brought out by all of the speakers are as follows:

1. The Birney safety car, as built to-day, is suitable for some service in practically any town in the United States regardless of size. In many towns at least 75 per cent of the total service can be handled by the safety car.

2. The importance of employing the existing standard construction for universal application was impressed upon everybody. "Old man local conditions" was discussed pro

and con, it being the consensus of opinion of those present that in every locality where the situation had been carefully analyzed it has been possible to modify the conditions slightly without any great handicap so that the present standard car could be used.

3. Practically every installation of safety cars has resulted in increased revenue due, in most cases, to increase in the number of fares collected and decreased operating expenses.

4. If properly handled, it seems possible to combat every argument that has ever been raised by the commissions, the public, existing ordinances and the labor organizations. The reason for the advocates of the safety car being able to overcome any objections raised is due to the ultimate result of better service and increased income to the operating company.

5. Past installations of the safety car indicate that safety cars pay for themselves in three years.

6. In order to get the best possible operation of the safety car, it is logical so to modify the auditing system that the operator is not called upon to do any unnecessary clerical work.

7. The public traveling on the safety car unconsciously acts as a watchdog for the railway company. Numerous operating companies report that receipts materially increased since the one-man safety car has been adopted. In other words, the conductor-motorman gets all the fares and turns them in.

8. The changing over of old cars without adopting the accepted safety features should be discouraged, as it throws discredit on the up-to-date safety car, and often there has resulted in undeserved criticism of a system of transportation which has never been tried out.

9. Many operating men have felt that the present standard safety car is light and flimsy. General opinion, however, indicates that with a reasonable maintenance the car will most likely have a life in excess of its logical economical life, due to obsolescence in an ever developing art.

10. There seems to be a feeling that it is possible materially to decrease weight of the safety car. Possibly the car should carry less people, should be designed so as to use high-grade automobile materials, possibly be equipped with hollow axles, tapered fit wheels, etc.

11. Sixty passengers represent a full practical load for a safety car.

12. Mr. Bosenbury pointed out that electric railways indulge in a most expensive game when they attempt to use passenger cars to buck snow. They are not designed for it and will not do it. Regulation snow fighting equipment should be used.

## Preventing Condenser Tube Corrosion

A REPORT of the corrosion committee of the Institute of Metals of Great Britain, presented on March 25, contains among a wealth of valuable data, analysis and recommendations the following conditions under which a 70:30 brass condenser tube should have a minimum life of twenty years:

1. Only clear water to enter the tube, or water which will not deposit suspended matter.

2. The water must be free from gases in suspension, and must not contain more than the normal amount of air in solution.

3. The water must be neutral or not more than very slightly alkaline. It must be free from ammonia and certain other specially harmful substances which are, however, of comparatively rare occurrence in waters used in power plants.

4. The temperature of the cooling water in the hottest part of the condenser should not exceed 35 deg C. (95 deg. Fahr.).

5. The speed of the water should be about 5 or 6 ft. per second.

6. The steam should be properly distributed in the condenser, according to the best modern design practice in this field.

# AMERICAN ASSOCIATION NEWS

## Executive Committee Will Appoint Committee of One Hundred

THERE was a good attendance at the meeting of the executive committee of the American Electric Railway Association in New York on June 10. President Pardee presided. Others present were T. S. Williams, P. J. Kealy, F. R. Phillips, R. E. McDougall, James H. McGraw, S. M. Curwen, Guy E. Tripp, W. Caryl Ely, John J. Stanley, B. E. Cobb, S. E. Wolff, J. G. Barry, P. H. Gadsden, E. K. Hall, E. B. Burritt, W. O. Wood, J. K. Choate, H. C. Clark and H. W. Blake.

The most important subject considered was the appointment by President Wilson of a federal commission to investigate the electric railway problem. The executive committee decided that the industry should be in a position to assist the commission in the supply of data or in any other way which might be requested, and that a committee of one hundred should be appointed to take charge of the matter. By unanimous vote of the other members of the executive committee Mr. Tripp was elected chairman of this committee and Mr. Kealy volunteered to give the next two weeks of his time to assisting in the details of the organization. It is hoped that the personnel of this committee can be announced next week.

The executive committee also voted in favor of recording its approval of the present daylight-saving act, and the following telegram was sent to Senator Calder of New York:

> The executive committee of the American Electric Railway Association desires to record with you and your associates in the Senate its disapproval of any measure looking to the repeal of the present daylight-saving law.

Secretary Burritt also reported on the reservations for space at the October convention. The latest figures on this subject will be found elsewhere in this department under the report of the meeting of the exhibit committee.

## Mail Hearing in Washington

THE first of the series of hearings to be conducted by the Interstate Commerce Commission to determine the rates which are to be paid by the United States Government for the transportation of mail on the electric railway lines of the country was held in Washington, D. C., on June 9. Seventeen other hearings will be held in different cities before July 28 at which time it is hoped all the testimony required will be gathered. The full schedule of these hearings was published on page 926 of the issue of this paper for May 10.

Those in attendance at Washington representing the government included: Examiner Brown, and M. O. Lorenz, chief statistician, Interstate Commerce Commission; J. Stewart, assistant to the attorney general, and J. B. Corriden, Superintendent Division Railway Adjustment, Post Office Department. The electric railway representatives included: S. S. Ashbaugh, the attorney who will represent the American Electric Railway Association at all the hearings; J. H. Hanna, Capital Traction Company; L. H. Palmer, and R. L.

Chamberlaine, United Railways & Electric Company of Baltimore; W. L. Clark, Washington Railway & Electric Company; J. H. Alexander, Cleveland Railway; F. W. Coen, Lake Shore Electric Railway; W. D. Witt, Philadelphia Rapid Transit Company, and James W. Welsh, American Electric Railway Association.

Commissioner Brown presided, and the examination of he railway witnesses was conducted for the Post Office Department by Mr. Stewart, who it is expected, will ct in this capacity at all of the hearings in the series.

The first witness for the railways was Mr. Welsh who presented a number of exhibits including a circular escribing the method of computing cost of mail servce recommended by the association and issued by it. Mr. Hanna, who was chairman for the Washington meeting of the railways there, then presented the exhibit for his companies and explained various operating conditions which existed when the Washington companies were carrying the mail, a practice now practically discontinued. Mr. Palmer then presented a detailed statement for his company of the cost of conducting an independent car service. The Charleston Consolidated Railway & Lighting Company, the Charleston sle-of-Palms Traction Company and the Hagerstown & Frederick Railway Company, also presented briefs. In eneral the testimony of the railway officials was that he compensation for carrying mail should be at least hree times what it is at present. This was borne out y the exhibits presented.

At the close of the hearing Commissioner Brown reuested, hereafter, that five copies of all exhibits be resented as follows: Two for the Commission, two or the Post Office Department and one for the railway ttorney.

## Applications for 10,000 Square Feet

A MEETING of the exhibit committee of the American Electric Railway Association was held in New ork on June 12. Those in attendance were C. R. Elliott, chairman; Fred C. J. Dell, F. H. Gale, J. C. Mc-uiston, A. M. Robinson and E. D. Smith.

The committee decided to appoint two sub-committees. One on decorations and space assignments will e composed of Messrs. Dell, McQuiston, Gale and Sen-r. The other on publicity in connection with the onvention daily consists of Messrs. Gale, Dempsey and obinson. It was also decided to employ a director of xhibits.

Secretary Burritt announced that although the applition blank for exhibit space did not go out until June already about 10,000 sq.ft. of space had been applied r. After a discussion of the finances, the committee djourned.

## Valuation Principles Analyzed

THE valuation committee of the American Association met in New York on June 11 to continue its scussion of basic principles. The members in attendce were P. J. Kealy, Kansas City, Mo., chairman; . H. Sawyer, Columbus, Ohio; Martin Schreiber, New-k, N. J.; George Weston, Philadelphia, Pa., and B. E. ilton, Syracuse, N. Y. E. B. Burritt was also present.

As arranged at the preceding meeting of the committee, Mr. Weston had formulated a statement of rdinal valuation principles and the various elements to be included in an appraisal. The discussion centered around this statement, each section being carefully examined as to its phraseology, intent and probable effect.

The executive committee of the Claims Association met in New York on June 11 for the purpose of discussing the work of the association and outlining the program for the coming convention. Those in attendance were R. E. McDougall, Rochester, N. Y., chairman; S. B. Hare, Altoona, Pa.; H. D. Briggs, Newark, N. J., and George Carson, New York, N. Y.

# LETTERS TO THE EDITORS

## Increasing the Earning Capacity of Electric Railway Lines

NEW YORK CITY, June 4, 1919.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for May 31, there are two very interesting articles concerning the economies in electric railway operation which must be striven for in order to meet the entirely new conditions which have been brought about by the period of readjustment. I refer to the editorial entitled "There Is a Better Outlook in Railway Power," and the abstract of the paper by Alexander Jackson printed under the heading "Plain Words on Transportation Service." These articles give a comprehensive summary of the details of operation in which great improvement is possible in the direction of scientific management.

As a long-time advocate of higher efficiency and scientific investigations in the operation of electric railway cars, I would suggest that there is another great field that more than ever assumes practical importance in these days of enforced thrift, namely, the careful analysis of the power requirements of the car under different service conditions and modes of operation.

There are people in the electric railway field who can never abandon rule-of-thumb methods of operation, and they must be left to their fate. There are, however, many up-to-date operators who have kept close watch of the car operation end of the business, where most of the company's expenses are incurred, and they realize that there is a close relation of efficiency in car operation and net earnings. In the mind of a man of this type such questions as the following are arising during these days:

> Is the kind of service formerly found to be efficient necessarily to be revised to meet the unexpected and sweeping changes that have recently taken place? Are the schedule speeds formerly used the most economical in view of the very heavy increases in platform expense?
>
> In order to meet increased traffic demands, is it better to raise schedule speed or to provide increased seating capacity at lower speeds with the aid of trailers?
>
> Is it wise to run with an abnormally high percentage of coasting when it is possible by speeding up schedules to get in some extra runs without increase of wages?

These questions merely hint at the many-sided character of the problem of efficient operation. Never was careful investigation more fully justified by conditions than it is at the present time.

Another matter in the same general field is that of adapting cars to satisfactory methods of fare collection. We have the prevalent heavy, doubly-manned single-fare car that has suddenly become a money-eater; also the safety car that cannot take care of the ordinary heavy traffic, and finally the highly complicated car for the automatic collection of zone fares. There ought to be some kind of an intermediate solution of this problem in which the several requirements can be met, the car being provided with devices to insure safe service and permit a semi-automatic system of fare collection.

F. CASTIGLIONI.

## Way Engineer Wants Car Weights Reduced

BROOKLYN RAPID TRANSIT COMPANY
BROOKLYN, N. Y., June 10, 1919.

To the Editors:

Anent your editorial in the issue for June 7 on "City Track Not an Energy Saver," I note that in comparing automobiles with street cars you say that it is the cost of rubber tires rather than energy economy which dictates the use of track. This is probably true as it affects the comparison between street cars on rails and autobuses out on the pavement, but there are some other factors which have even more weight in rendering desirable the use of tracks made of rails.

Historically, transportation by rails had its beginning in the need for some means of hauling heavy loads over bad roads by other means than the easily mired wagon wheels. We still have the heavy loads, even though we have better roads, and the most modern pavement as ordinarily put down will not long withstand the destructive effect of carrying 30 to 40 tons steadily and continuously in one path as the rails are still required to do in many of our city railway systems.

The track man has been forced to build track for the heaviest loads which the car builders for a long time seemed to think had no limit. This has been true in both steam and electric railway service. While you are pleading for the rails please make a plea for the continuation of the efforts now being made to relieve the track of its unjust burdens by lessening the car weights. The ultimate savings in operating costs of all kinds to be gained by so doing are obvious.

R. C. CRAM,
Assistant Engineer,
Department of Way and Structure.

## The Seatless Car Idea Will Not Down

NEW YORK CITY, June 9, 1919.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for June 7 a news item was published to the effect that Tokyo has been added to the list of foreign cities where the seatless car is being tried out. In August of last year it was noted in your columns that the scheme was under test in Rome. As one of the contributors to the paper puts it, under rush-hour conditions the public must generally ride standing and has become inured to doing so. Since the first duty of the car seems to be that of carrying passengers, the matter of how much comfort is provided is to a certain extent secondary. If more people can be carried standing, without indecent overcrowding, it certainly is the part of wisdom for transportation engineers to give the seatless car scheme more serious consideration. Such cars should load and unload faster, and consequently get over the road more quickly. This is a desideratum in rush-hour service.

The gain in service thus provided is augumented by the ability to carry more passengers in a given time with the same amount of equipment. The cars also would be doing more effective work in carrying passenger weight instead of dead seat weight.

In earlier editorial comment the JOURNAL stated that it did not wish to be understood as recommending the plan except in an emergency and where the run was short. While the paper has presumably not changed its position in this regard, would it not be well to suggest that some enterprising company in this country should try the scheme out? In order to put it over right it would obviously be necessary to advertise the plan properly before doing so, and to point out the advantages carefully, not forgetting "to beat the objector to it" by showing that most of his objections have been foreseen and that the trial is being made solely to get at the true situation in regard to the question of how far the people are willing to stand provided they can get a chance to do even that. I am inclined to the view that a well-planned advertising job would have every chance of making a success of a scheme which operators now hesitate to give a serious trial.

"OBSERVER."

## Maps Carried on French Subway Cars Also

60 WALL STREET
NEW YORK CITY, June 10, 1919.

To the Editors:

The article in your last issue on "Why London Subway Riders Do Not Go Astray" shows that the rapid transit management is alive to the importance of merchandising transportation, but the fact is equally true of the Paris subway managers. In Paris the cars carry an outline map of the route, very similar to that described in connection with the London underground roads. Each station is indicated by a black circle, and the stations connecting with other lines are indicated by a double black circle with an intersecting line. At a connecting point a short description is given of where the other line goes.

The whole map takes up a space of 4 in. x 18 in. and is usually mounted on the door in an up and down position. In some cases, however, it is mounted by the side of the door, and on one line it is placed on the ceiling of the car in the form of a "V" and can be seen from any point in the car. All that a person has to do to determine his location is to note the name of the station at which the train is stopped, and then by looking at the map his position is at once apparent. It is thus possible for a total stranger to get around the city with very little trouble.

This system of maps in the car would be a distinct advantage in American practice and would be applicable to subways, elevated trains, suburban electric and steam trains and to surface cars. For use on the surface cars only the principal streets and transfer points would need to be indicated.

K. B. HUMPHREY.

The London Underground Railways and London General Omnibus Company are having good success with their group operating department efficiency meetings. The purpose of these is to give the members of the administrative and control staffs some knowledge of the equipment and its operation. Recent programs included an illustrated lecture on bus maintenance and a number of papers presented by members of different grades of the control staff on "Problems in My Official Life."

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Settlement Plan for Denver

### Manager Hild Staggered by Proposal of Citizens' Committee—Mayor Threatens Reprisals

The adjustment committee of fifty-five citizens appointed in January by the Mayor of Denver, Col., has recommended a special election to adopt the service-at-cost plan for the Denver Tramway under a board of control, two members to be appointed by city and one by the tramway, to take over the management of the system. The committee has also recommended the abolition of the $60,000 yearly franchise payments, paving between rails and free riding by city employees. If the plan works the city may purchase the system upon the basis of the Public Utilities Commission valuation of $23,674,100.

The company now operates with a 6-cent fare. The new Mayor, Dewey C. Bailey, who took office on June 1, has advocated the restoration of the 5-cent fare. F. W. Hild, general manager, states that a 5-cent fare now would nean a receivership for the company. n this connection Mr. Hild is quoted is follows:

> The 5-cent fare would make it impossible to meet these charges, so that receivership must inevitably follow and you, as a business man, well know that a receiver, who is an officer of the court, must, under he law, seek to protect the investment in he property.

Regarding the proposal of the committee of fifty-five for a board of control of three members to take over the management of the tramway on a ervice-at-cost plan, Mr. Hild said in art:

> I can only reiterate that the proposal s so revolutionary that we have not yet ecovered from the first shock. It is such radical departure from any plan ever proposed before that we have not been able to ormulate an opinion.
>
> Two things stand out very clearly, however. The valuation is obviously too low. Ve thought we had introduced evidence nough to convince anybody that the investment in the tramway far exceeds the aluation accepted by the committee of fty-five.
>
> Furthermore, the limit of return set in ie report is too low to attract capital to ie traction business. We cannot hope to ompete for capital with other legitimate usinesses with a limit of 7 per cent on our eturns.

It is not expected that the directors f the company will consider the plan ormally until their meeting on June 3.

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## Vants Philadelphia Plan Changed

William S. Twining, transit director f Philadelphia, Pa., has come out penly against the plan of rapid transit or Philadelphia formulated by A. Merritt Taylor, who formerly was director. Using the changed conditions rought about by the war and holding up the menace of a higher fare resulting from an increased construction cost of $6,000,000, Mr. Twining concludes that the transit plans must be changed. He says:

> It is now generally recognized by the public that the conditions under which the city entered the transit field in 1915 no longer obtain. While possibly the plans as then adopted might have been considered perfect, it is now evident, that, as a result of the unexpected developments of the last three years, the city's transit plans must be modified if the city expects to escape with a reasonable fare under the contract which has been signed with the Philadelphia Rapid Transit Company. The city's system as now authorized will probably cost upward of $60,000,000 more than was originally contemplated when the fare was expected to be 5 cents and the resulting increase of interest and operating cost of the system must appear in the fare.

To get away from the Taylor plan, Mr. Twining recommends a referendum by which the people may reconsider their former decision.

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## Mr. Lilienthal Died Helping Others

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., whose death was announced in the ELECTRIC RAILWAY JOURNAL for June 7, succumbed suddenly as he reached the climax of a speech at a luncheon at the Hotel St. Francis in that city on June 3, inaugurating the loan drive for St. Ignacious College.

To those who were in attendance, Mr. Lilienthal seemed in good health. The tenor of his address was a high-minded appeal to the city to make the drive a success. He said that Protestant, Catholic and Jew had been working hand in hand across the seas, and that he could think of no organization that was better prepared to oppose the forces of the agitators and malcontents than the Roman Catholic Church. In this connection he said:

> In times like these we know no creeds. For the American of to-day there should be only one thought—one country, one flag and one God.

As he uttered these words, Mr. Lilienthal staggered, reached out a hand for a chair in which he had been sitting before being called to speak, and then collapsed. His wife and son were immediately notified.

William von Phul, general manager of the United Railroads, paid the following tribute to Mr. Lilienthal:

> In the death of Mr. Lilienthal San Francisco has lost one of her foremost citizens. and the United Railroads a president whose influence was always for the good of the community, a man in whom everyone had implicit confidence. Every employee of the company feels his death as that of a personal friend. During the three years in which I have been closely associated with Mr. Lilienthal, there is no one whom I have admired more, and of whom I have greater knowledge of his high ideals and thoughts for others. He has practically sacrificed his life in service to the community.

## Suit Follows Strike

### Pittsburgh Attorney Seeks to Establish Point that Public Service Employees May Not Strike

In one of the most unusual actions ever brought in a Pennsylvania court, a Pittsburgh attorney has sued the Amalgamated Association of Street & Electric Railway Employees for $2,038,000.78, which sum he estimates as the amount of the damages that were inflicted by the employees of the Pittsburgh Railways in their recent four-day strike.

The complainant is A. E. Anderson, of the Allegheny County bar. In his petition for a hearing in equity in the matter he submits a tabulated bill of damages resultant from the strike. His own share of this bill is the 78 cents, the difference between his railroad fare during the strike, and car fare. The other $2,038,000 is what he figures as the loss sustained by the riding public in paying for transportation during the strike at rates higher than carfare, by the receivership of the company in loss of revenue, and by the strikers themselves in loss of wages. Attorney Anderson has entered his suit in behalf of all of them.

### SUIT IS TEST CASE

The suit is meant, of course, not as an effort to recover damages, but as a test case. The complainant raises the point that public service employees may not lawfully strike and he wants a court to hear his arguments and rule on the question.

Mr. Anderson contends that courts have held that the right of persons to quit work and induce others to do so is "necessarily subject to limitation when employment is accepted in a business charged with public interest." His huge bill of damages is made part of his suit to show the extent to which the public interest was involved in the strike.

After setting forth the circumstances of the strike Attorney Anderson concludes with a petition to the court that it decree that the actions, rules and regulations of the defendant association. its officers and members are illegal, null and void and that the association, its officers and members have become liable to "your orator and other citizens for the loss and damages above set forth."

The strike of the employees of the Pittsburgh Railways was declared on May 14 and came to an end on May 18. The issues involved were reviewed in the ELECTRIC RAILWAY JOURNAL for May 17, page 977, and May 24, page 1020.

# Detroit Men Strike

## While Council and Railway Talk and Juggle Figures Men Tie Up Entire City System

Service on the lines of the Detroit (Mich.) United Railway ended 4 a.m., on June 8, the motormen and conductors having voted in favor of a strike at their meeting on June 7. On the recommendation of their officers, the strikers agreed to continue to carry milk and perishable freight into the city, but to turn back interurban cars at the city limits. The interurban employees will not be called upon to join the strikers unless it is evident that the increased wages will not be granted within the next few days.

### COMPROMISE OFFER FAILS

Up to June 6 hope was expressed by all parties concerned that a strike would be averted. Mayor Couzens called a special session of the Council that day. Although one of the Councilmen voiced his opinion that the situation, serious as it was, was not a matter to be decided by the Council, but rather by the men and the company, a majority vote was obtained favoring a compromise offer as follows:

Stright 5-cent fares on all lines, with universal free transfer, abrogating the Pingree 3-cent franchise and workingmen's eight-for-a-quarter tickets.

F. W. Brooks, president of the company, stated that it had been agreed to grant the men a compromise increase of 10 cents an hour, subject to confirmation by the union. In order to meet this increase he contended that the company would have to demand a 5-cent fare on all lines with 1 cent for each transfer issued.

It was brought out in the discussion that the city's audit of the company's revenues and expenses varied from the company's audit by about $139,000 for the three months ended March 31. the city showing a gain instead of loss. The main difference resulted from an item of $100,000 which Comptroller Engel deducted from the depreciation charges claimed by the company.

President Brooks stated that the company could not surrender any franchises except those of the Pingree and Milwaukee Avenue lines, because they were the only ones granted by the city. Other stub-end franchises were granted by townships (since absorbed by the city) and are affected by mortgages which have to do with other property, he set forth.

### FARE CHANGES SUGGESTED

In the final discussions it was contended by the city officials that the abrogations of the Pingree franchises would be a concession to the company since the company is losing money on the 3-cent lines. The elimination of workingmen's tickets and raising of fares on all lines to 5 cents would increase the company's revenue $1,190,000, sufficient to pay the 10-cent wage increase. This new rate of fare was to be tried for three months and at the end of that time a readjustment would be made if found necessary. These suggestions were turned down by Mr. Brooks.

To the demand of the men President Brooks replied that he was obliged to notify them that the company could not undertake to carry out their proposition until the City Council granted the necessary relief. The offer of the city he stated was entirely inadequate to care for the situation.

Mayor Couzens in his statement of June 7 said in part:

> On June 3 figures were presented to the Common Council, together with estimates of what certain increases in fare based on estimated passenger traffic, would mean to the company.
>
> Basing the passenger traffic income on the experience of the three months under review, it was estimated that the company would carry 305,000,000 passengers in 1919, which at the present rate of fares, would bring in an income from passenger traffic of $14,060,500, and that the railway had an income from other sources aggregating $215,000, making the total estimated income for 1919 $14,275,500; and that if the Common Council would grant the company a straight 5-cent fare, which the Council has now promised to grant, the gross income would be $15,465,000, or an increase of $1,189,500 for the year.
>
> In view of the fact that all the records show that the company was not actually losing money at the present rate, it seemed that what the city should do would be to grant the company a sufficient increase to permit it to pay the increase to the men, which the honorable Common Council, by resolution, agreed to.

At eight o'clock on the night of June 9 Circuit Judge Adolph Marschner issued an injunction restraining the railway from suspending service on the 3-cent lines. Under section E of the appeal for the injunction, which is signed by Mayor James Couzens and Corporation Counsel Wilcox, the court is asked to appoint a receiver for the company if it fails to operate cars.

### COMPANY WITHIN ITS RIGHTS

The city leaves the wage settlement entirely up to the railway and its conductors and motormen. It is pointed out that the company is solvent, has upwards of 800 miles of railway in the city and State and has a large surplus, and is able to pay the advance required by its employees.

The city's action is based principally on sections of the old Detroit Railway franchise granted on Dec. 4, 1894. In Section 11 the franchise is designated as a "contract," while Section 18 provides for court proceedings to settle any dispute.

Councilman John C. Nagel filed notice of a reconsideration at Tuesday's Council meeting of the resolution passed last week allowing the railway a straight 5-cent fare. This action was taken prior to the city's court action to force the railway to resume service on the 3-cent lines, and will limit the amount of fare collected on these lines to the former rate of eight tickets for 25 cents during the day and six for 25 cents at night.

President Brooks mailed a statement to the Common Council, offering to arbitrate the differences between the city and the railway and declaring that the legal position of his company was unassailable. He suggested the Public Utility Commission as arbitrator.

The legal attack on the railway followed a series of conferences on June 9 between Attorney General Alex. J. Groesbeck, Corporation Counsel Wilcox and Attorney Otto F. Kirchner.

Service of the writ of injunction on Harry V. Catlin, cashier of the railway, at noon on June 10, ordering the company to operate cars at once on the 3-cent lines, made the injunction effective immediately, according to opinion of Judge Marschner, who issued the writ. After a reasonable time has been allowed Mr. Catlin to get in touch with his superiors, whom the officers were unable to find, the company's officials will be adjudged in contempt of court.

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The city officials of Detroit and the officers of the Detroit United Railway reached a compromise agreement on June 13 providing for a straight 5-cent fare. There will be a board of three members to decide after trial whether a charge for transfers is necessary. The settlement agreement made the court order binding on both parties. One member of the arbitration board is to be chosen by the city, one by the company and the third by the first two. If the board is unable to decide the fare charge the case will go to the Circuit Court as a rate case. The employees are still protesting a 9 to 12 per cent increase. They ask an increase of 17 per cent.

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# Windsor Wage Audit Arranged

The special street railway committee of the Council of Windsor, Ont., first recommended that the Council repeal or withdraw the by-law to grant the Sandwich, Windsor & Amherstburg Railway increased fares. As this was not in accord with the opinion of all members of the Council, amendments and amendments to amendments were submitted and in turn voted down.

The Councilmen finally decided that the railway board could best settle the question relative to the demands of the men, after City Solicitor Frank Davis had introduced a resolution, asking the railway board to step in and investigate the company's accounts by an audit of its books. It was accordingly decided to ask the Ontario Railway Board to determine if higher fares are necessary to meet the wage demands.

Some members of the City Council upheld the by-law and fought for its amendment, leaving out Sandwich, where the company can charge a 5-cent fare without the referendum.

The transportation committee set forth that the Ontario Railway Board is in position to say what wages the company shall pay the men and what rate of fare will be charged, and also have absolute power in investigating the books of the company. It was also stated that municipal intervention was logical only if city cars were tied up.

## Paving Controversy in Pittsburgh

City officials of Pittsburgh, Pa., resorted to vigorous action in their controversy with the receivers of the Pittsburgh Railways over the street paving during the week ended June 7, when a gang of city workmen was sent out to remove the tracks from a section of Warrington Avenue. Within six hours an injunction to restrain the city had been granted and dissolved. The tracks were then removed.

The basis of the dispute between the city and the receivers is an ordinance of long standing requiring the company to repave between its tracks wherever the city improves a street. Ever since the financial difficulties of the railway reached a crisis with the appointment of receivers the city has complained of failure on the part of the company to obey this ordinance.

Extensive improvements are under way in Warrington Avenue and the expense to the company of its share would be about $100,000. It has been one of the contentions of the receivers, during disputes with its employees over wage matters and with the public over proposals for higher fares, that the present income and expenses of the company do not allow money even for such essential expenditures as this.

The section of track the city has torn up is not in use. Cars are running on other portions of the street for which improvements are contemplated, but an agreement on division of expenses is expected to be reached before there is occasion for the city to tear up any more track. The proceedings were the first open clash between the city administration and the present receivership.

## Talk of Separate Commission for Washington

The House of Representatives district committee may report a bill to create a public utilities commission separate from the District Commission. This belief is based largely upon a discussion that took place among members of the appropriations committee when the payment by the utilities commission of money for expert service was under consideration. It was contended by Representative Gard that a separate commission that could give all its time to consideration of utilities matters in the District of Columbia would not have to spend money for expert services. The suggestion was made that the matter could be looked into profitably by the District committee.

If a measure creating a separate commission is framed and sent to the commissioners for an expression of their opinion it will meet with the disapproval of at least two members of the board of commissioners, according to present indications.

The commissioners of the District of Columbia are ex officio members of the Public Utility Commission of the District of Columbia. Two of them are not engineers and they have very little knowledge of transportation, finance or other matters coming up in the operation of public utilities. Worst of all, their duties as commissioners of the District of Columbia in handling matters of police, opening of streets, fire insurance regulations, building ordinances, etc., are so varied and taxing with respect to calls upon their time, they have very little time left to devote to their duties as public utility commissioners.

## Buses Planned for Detroit

The Detroit Motor Bus Company has been organized under the laws of Michigan with an authorized capital stock of $1,500,000 to "give new and better transportation and make Detroit a better place to live in." The company is headed by Richard W. Meade, formerly president and general manager of the Fifth Avenue Coach Company, New York City, operating the buses on Fifth Avenue in that city.

The Detroit Motor Bus Company proposes to operate under the general ordinance approved by the City Council of Detroit on Dec. 26, 1917, as amended on March 26, 1918, licensing the operation of motor buses on specified streets. It is proposed to provide for initial service 100 motor buses of forty-seven-passenger double-deck type, similar to those in New York but lower in height. Three principal routes have been selected for initial operation as supplying relief where most needed and most readily given—one on each of the nearest available streets on either side of Woodward Avenue, running to the Ford plant and the city limits respectively, and the third on Jefferson Avenue, running to the city limits or some intermediate point. All of the routes will have terminals at the Campus Martius and will reach the principal points of attraction in the central district of the city.

In a circular describing the proposal, the gross annual operating revenue when the lines are in full operation is estimated at $1,235,160, with operating expenses, taxes and deductions of every character at $946,080, leaving a net income of $289,080. The stock of the company has a par value of $10 per share and is being offered for popular subscription in Detroit.

## No Changes in Illinois Commission

The efforts have failed which were made at the recent session of the Legislature of Illinois to curtail the functions of the Public Service Commission or to put that body out of business. The "home rule" element, mostly mayors of smaller cities, was particularly active in the fight. A test vote of eighty-four to fifty-four on June 5 saved the commission.

Only one more bill regarding regulation is pending. This proposes to increase the membership of the commission from five to seven, thereby providing a continuous reviewing court for Chicago and upstate cases. This is said to be favored by a majority of the lawmakers because it will enable the commission to act more promptly on the many appeals which are now pending.

Chicago's traction bills are said to be dead. These included four proposals for enabling legislation which will be needed before effective changes can be made in the existing franchises. The bills were presented late in the session. While they appeared to have the indorsement of all interests, there was little hope for them from the start because the Legislature will adjourn in a few weeks. The bills were referred to in the ELECTRIC RAILWAY JOURNAL for May 17.

## Warns of Labor Unrest

Addressing the annual convention of the National Conference of Social Workers at Atlantic City, N. J., on June 2, Basil Manly, joint chairman of the National War Labor Board, warned that a period of unrest and strikes, which would overshadow all previous disturbances, was about due in the United States. He is quoted as follows:

> We are about to enter a period of the most acute industrial unrest and the most bitter industrial controversy that the American nation has ever known. Unless effective and radical steps are taken to bring about a better understanding between labor and capital and to establish an equitable basis for orderly industrial progress, we are certain to see within the next year strikes and mass movements of labor beside which all previous American strikes will pale into insignificance. Since the signing of the armistice we have had a large number of small strikes and a few great spectacular strikes. But these have been so limited in comparison with the labor upheavals in other countries that there has been a public disposition to regard the industrial situation with complacency and to assume that, having passed through the first part of the period of transition without serious industrial disturbance, we were about to enter an era of industrial peace.

## American Ideals Taught

Classes in citizenship organized last November by the Minneapolis (Minn.) Street Railway received diplomas on the night of June 3 at graduating exercises in the carhouse at Washington and Twenty-fourth Avenues, N., to which 500 members of the families of the 125 conductors and motormen were carried by special cars. The diplomas were signed by the Secretary of Labor of the United States and officials of the Minneapolis public schools. A similar graduation will be conducted soon in St. Paul.

Horace Lowry, president of the Twin City Rapid Transit Company; Prof. A. E. Jenks, of the University of Minnesota; Mayor J. E. Meyers; W. D. Dyer, W. A. Anderson and Supervisor of Americanization W. R. Ball spoke. The audience recited together:

> I pledge allegiance to my flag and the republic for which it stands; one nation, indivisible, with liberty and justice for all.

The classes have been conducted in four carhouses once or twice a week. Similar classes will be instituted next fall.

## St. Paul Inquires Into Traction Affairs

The St. Paul Association has made public an analysis of the survey of electric railway conditions in the United States conducted for the association by C. Whit Pfeiffer, secretary of public affairs of that body. No recommendations are made in regard to terms for a settlement of transit problems with the Twin City Rapid Transit Company, but it is pointed out that the service-at-cost plan appears to be more satisfactory than the old time franchise.

The association will not go on record favoring any plan of solution of the local railway problem, until a thorough study of the entire situation has been made. Preliminary consideration of Mr. Pfeiffer's report will be begun at once. Special sessions of the City Council also will be held to consider the proposed franchise and citizens are asked to attend these meetings that they may hear the discussions and keep intimately informed of the progress of the negotiations.

## News Notes

**Boston Strike Averted.**—Union employees of the Boston (Mass.) Elevated Railway have voted by a large majority to refer to the War Labor Board the wage and hour demands recently served upon the company.

**Cambridge Subway Purchase Bill Reported.**—A bill favoring the purchase of the Cambridge subway from the Boston Elevated Railway at a price of $8,000,000 by the State of Massachusetts has been advanced to a third reading in the House of Representatives.

**Negotiating for Windsor Road.**—Negotiations are reported to be under way by the Hydro-Electric Power Commission of Canada for the purchase of the 28 miles of electric railway owned by the Detroit (Mich.) United Railway in the Windsor-Sarnia-Ford City district. The properties are included in the system of the Sandwich, Windsor & Amherstburg Railway.

**Muskogee Strike Settled.**—The strike on the lines of the Muskogee (Okla.) Electric Traction Company has been settled. An increase of 30 per cent has been made in the wages of the men, all of whom have been reinstated to their former places with seniority rights. The strike was in progress more than a week. During that time no cars were operated.

**Toronto Mayor Planning Ahead.**—Mayor Church of Toronto, Ont., at a recent meeting moved that a recommendation be made to the City Council favoring the submission of a by-law to the people at the next municipal election providing for the expenditure of $5,000,000 on track extension, rolling stock and other equipment, preparatory to the taking over of the Toronto Railway in 1921.

**Wage Increase on Evansville Interurban.**—Following a conference on June 4 between officials and trainmen of the Evansville-Princeton line of the Public Utilities Company, Evansville, Ind., the company granted the motormen and conductors an increase in wages amounting to 5 cents an hour. The men on the interurban line have been receiving from 34 to 38 cents an hour on a sliding scale. Under the new agreement the men will work nine hours where they have been working ten and ten and one-half hours. It is reported that motormen and conductors of the Evansville & Newburg Suburban Company and the Evansville & Ohio Valley Railroad will make demands upon these companies for the same scale of wages granted on the Princeton line.

**City May Act in Paving Case.**—A resolution calling on the Birmingham Railway, Light & Power Company, Birmingham, Ala., to pave Tuscaloosa Avenue from Sixth to Poplar Streets, a distance of about 2 miles has been adopted by the City Commission. The commission has set June 15 as the date by which the company must start work. Lee C. Bradley, receiver for the company, informed the commission that the company's portion of the paving on Tuscaloosa Avenue will amount to $157,000 and that other paving is demanded in other parts of the city, which amounts to $750,000. He stated that no date on which work can be begun can be stated at this time. The city is ready to proceed with the paving, which was held up on account of the war. Legal steps will probably be taken by the city in the Federal Court in an effort to enforce the work if it is not started by June 15.

**Increase for Hull Men.**—The employees of the Hull (Que.) Electric Railway, including shopmen, conductors and motormen, are granted an all round increase of 3 cents per hour, by the terms of the award of the board of arbitration, which was appointed by the Minister of Labor to adjudicate the dispute between the company and its employees. If the award is accepted by the men, it will mean that third-year motormen and conductors, who were receiving 36 cents an hour will get 39 cents; second-year men who formerly received 34 cents will get 37 cents, and first-year men will jump from 31 and 29 cents to 34 and 32 cents. All shopmen and other employees will get a straight increase of 3 cents an hour, and in addition are granted the nine-hour day, with a provision, that in view of their reduction in hours, they shall not be paid less than they are receiving at present. All overtime is to be paid at the rate of time and a half, and the agreement is to be effective for a period of one year.

## Programs of Meetings

### American Railroad Association

The annual convention of Section 3, Mechanical, of the American Railroad Association will be held at Atlantic City, N. J., June 18-25. This includes the former Master Car Builders' and Master Mechanics' Associations. Some of the reports and papers of special interest to electric railway officials are at the morning session on Wednesday, June 18, reports and discussions on standards and recommended practice, train brake and signal equipment, brakeshoe and brakebeam equipment.

The Thursday morning session includes a report and discussion on car wheels, specifications and tests for materials, welding truck side-frames, bolsters and arch-bars, couplers and draft gear. At the morning session for Friday there will be a discussion of reports on safety appliances, car construction, car trucks, train lighting and equipment.

On Monday, June 23, there will be a discussion of reports on standards and recommended practice and mechanical stokers. The Tuesday program includes a discussion of the reports on fuel economy, smoke prevention and specifications and tests for materials. Wednesday, the last day of the convention, reports will be presented on design, maintenance and operation of electric rolling stock. There will also be a discussion on that day of reports on train resistance.

### Iowa Electric Railway Association

The program was announced on June 5 for the joint session of the Iowa Electric Railway Association with the Iowa section of the National Electric Light Association at the Hotel Colfax, Colfax, Iowa, on June 18 and 19. The papers planned to be presented on the afternoon of June 18 follow:

"Rate Litigation in Iowa," by William Chamberlain, general counsel of the United Light & Railways Company.

"Iowa State Board of Conciliation, Its Work and Possibilities," by W. G. Raymond, dean of the Engineering Department of the State University of Iowa.

The session on the morning of June 19 will be devoted almost wholly to business matters. There will, however, be a general discussion of the best pavings to be used in connection with street car tracks, with special reference to the advantages of cement, creosote blocks, brick and asphalt.

The papers to be presented at the session on the afternoon of June 19 are as follows:

"The Safety Car," by T. C. Roderick of the Tri-City Railway.

"Automatic Control of Substations," by C. W. Place, of the General Electric Company.

Following the discussion of these two papers there will be a general discussion of the subject of reclaiming of track and special work by welding and grinding.

# Financial and Corporate

## Seattle Lines in April

### Municipal Railway, Economizing, Hopes to Continue to Operate at a Five-Cent Fare

According to a statement issued by Thomas F. Murphine, superintendent of public utilities, the Seattle (Wash.) Municipal Railway system in April, 1919, had revenues from all sources of $421,252 and operating expenses of $331,242, leaving a gross profit of $90,009. From this amount was deducted $66,260 for interest on outstanding bonds; $6,911 for industrial insurance and $7,000 for accruing damage claims. Depreciation, it is said, was more than offset by extraordinary expenditures in the way of maintenance.

#### $9,838 PROFIT IN APRIL

The net profit for the month, therefore, amounted to $9,838. This sum, it is felt, will be increased in a large amount as soon as the railway is able to put into effect operating economies from time to time submitted to the Council. The only operating economies during April were the elimination of the greater portion of "dead-head" passengers and the discontinuance of operation of the Twelfth Avenue and Ray Street lines.

In April, 1919, the municipal lines operated a total of 27,582 more car hours than were operated in April, 1918, by the combined lines of the Puget Sound Traction, Light & Power Company and the Municipal Railway, Divisions "A" and "C." The municipal lines also operated 274,036 more car miles in April, 1919, than in the corresponding month of last year for both railway systems.

The transportation revenues increased over the corresponding month of last year in the sum of $60,383 or 17.0 per cent. This was due, in part, to a natural increase in traffic but in a greater part to the increase in the service.

Owing to the increased service and to an approximate 50 per cent increase of wages, trainmen were paid in April, 1919, the sum of $168,683 and in the corresponding month of last year $94,375, an increase of $74,308. The wages paid in the maintenance departments were correspondingly increased.

#### ECONOMIES INTRODUCED AND PLANNED

On June 1 the municipal lines began to install skip stops and will continue this work until all lines will operate under the plan. It is expected that this will show a saving of approximately $8,000 per month.

The municipal railway management believes that by putting into effect the operating economies recommended and discontinuing non-revenue producing lines that give practically no service to the public and not being compelled to operate non-profitable extensions of the system and various experimental transportation schemes it will be able on a 5-cent fare to pay all operating expenses, all interest on the bonds and set aside an amount sufficient to retire the bonds.

## Monongahela Earnings Fall

### Net Surplus for 1918 Dropped 37 Per Cent Because of Higher Operating Costs

The financial results of the operation of the Monongahela Valley Traction Company, Fairmont, W. Va., for 1918 were not flattering, in the company's opinion, for notwithstanding normal increases in the volume of patronage the net surplus for the year decreased $361,588, or more than 37 per cent, as compared with the previous year. The net earnings decreased $194,576 during the year, due principally to the great increase in operating expenses growing out of the raises in wages and the greatly increased cost of materials and supplies. The detailed figures for 1918 are given in the accompanying statement.

INCOME STATEMENT OF MONONGAHELA VALLEY TRACTION COMPANY FOR 1918

| | |
|---|---|
| Gross earnings from operation | $3,787,328 |
| Operating expenses, taxes, insurance and depreciation | 2,613,659 |
| Net earnings from operations | $1,178,669 |
| Fixed charges | 586,866 |
| Net surplus for the year | $591,803 |
| Surplus balance on Dec. 31, 1917 | 320,965 |
| Total | $912,768 |
| Less adjustment of accounts for previous years | 769 |
| Balance to credit of profit and loss before dividends | $904,999 |
| Dividends paid during 1918 | 616,657 |
| Surplus balance on Dec. 31, 1918 | $288,342 |

Fully realizing that the maintenance of dividends is wise, in order to maintain the high standards of credit which the company has always enjoyed, the officers regret that, because of the effects of high operating costs and large construction expenditures upon the company earnings, they found it necessary to discontinue the common stock dividend.

It is, however, the belief of the officers of the company that the Public Service Commission will grant relief by allowing increases of rates for certain classes of service, in answer to the petition which is now before it, as these increases are requisite to the further financing which the company must do at once because of the rapidly growing communities in its territory.

## St. Louis Suit Dragging

### Testimony Shows Probable Errors of Business Judgment Rather Than Deliberate Waste

The power contracts of the United Railways, St. Louis, Mo., from 1903 through 1918 constituted the principal bone of contention at the hearings during the week ended June 7, before Special Master Lamm at St. Louis in the receivership suit of John W. Seaman, New York, a stockholder of the United Railways.

#### POWER CONTRACTS CRITICISED

One of the allegation of the Seaman petition is that the letting of power contracts in 1913 and 1914 by the United Railway directors, several of whom were also directors of the North American Company, which controls the power distributing concern, constituted a waste of the railway's funds in that excessive rates were paid and huge profits made by the sellers of the power.

The testimony of W. E. Bryan, superintendent of power stations for the United Railways, developed the statement that the company in 1913 paid for 49,688,913 kilowatts though it used only 40,012,696 kilowatts and that in 1914 it paid for 107,418,815 kilowatts though it used only 98,483,900 kilowatts. The value of the difference between the power used and the power paid for in these two years was referred to as $140,000.

In answer to a question from the attorney for Mr. Seaman for an explanation of the difference between the amounts of power used and the amounts paid for, the witness explained that the higher figures represented the amounts of power contracted for and the lower figures the amounts that the company was able to use.

On the following day Mr. Bryan testified that for six years prior to 1908, when the contract was made, the load of the company had increased 51,743,576 kilowatts. If the load had increased for the next six years at the same rate, the company would have been using 220,000,000 kilowatts in 1914. Instead the load fell below the average of the previous six years, and the company found itself with more power than it could use.

#### LONG-TERM CONTRACT NECESSARY

The special master inquired whether the railway could not have contracted for power on a sliding scale to fit its needs. To this the witness replied that the successful promotion of the Keokuk hydro-electric power project depended upon the ability of the promoters to sell an amount of electricity sufficient to carry the fixed charges on their investment. For that reason the railway was required to contract for a stated amount.

To refute previous testimony Attorney Rassieur, for the defendant, brought out testimony showing that the railway could not have operated its own plants for the production of power as cheaply as it was able to buy both steam and water power from outside sources. There followed a long, bitter and complicated argument between the opposing attorneys concerning the methods used by various witnesses for calculating the cost of the current involved. The controversy was settled by the special master allowing the testimony to stand with the comment that he would rather err on the side of admission of testimony than of excluding it.

The salaries of attorneys and other employees of the United Railways before the receivership and of those appointed and retained by the receiver also consumed a good deal of time and developed considerable acrimony.

### Abandoned Road Is Sold

The entire property of the Parkersburg & Ohio Valley Electric Railway, Fairmont, W. Va., has been sold at public auction. The successful bidder was the Wilkoff Company, dealers in scrap iron at Pittsburgh, Pa., and Youngstown, Ohio. That company's bid was $16,000. It is understood that the purchasers will scrap the property, which consists of 4.6 miles of track and several bridges and trestles. The company never owned any rolling stock, the single car which was operated over it for a time being borrowed from the Union Traction Company, Sistersville, which also furnished the power. The road had not been operated for the last five years, during which time it has been in the hands of C. L. Williams, Parkersburg, as receiver.

The sale was made under an agreed order of the United States District Court. It was conducted by Judge M. H. Willis, New Martinsville, a special commissioner. It was cried by John Mitchell and by Judge Willis, himself. The bidding started off at $7,500, the road being first sold in sections. It was then put up as a whole and the bid of the Wilkoff Company for the entire property was the highest and best.

### $41,183,112 Bay State Valuation

The Public Service Commission of Massachusetts has issued an order in which it finds that the present amount of capitalization of the Eastern Massachusetts Street Railway, which is the reorganized Bay State Street Railway, as required under provision of the Bay State reorganization act, is $41,183,112. This was determined as follows:

Computation of investment value as of Nov. 1, 1914, $40,282,340; additions and improvements submitted to the commission, minus the value of property sold or otherwise disposed of, $1,866,516, making a total of $42,148,856.

From this total the commission deducted the amount of adjustment to represent the value on a 6 per cent basis of the rentals payable on account of properties of the railways leased by the Bay State within Massachusetts, amounting to $965,744. This leaves a net valuation of $41,183,112.

## Brighter Returns in February

### Railway Net Income Improves, but Increased Labor Costs Are Reflected in Transportation Expenditures

Operating reports of electric railways for the month of February, 1919, compiled by the information bureau of the American Electric Railway Association and presented herewith would seem to indicate when compared with the same figures for February, 1918, that for the first time in many months the increase in the operating revenues is beginning to approach within hailing distance of the increase in operating expenses. Or perhaps it would be more proper to say that the increase in operating expenses has been retarded enough to enable the increase in operating revenues to creep up a bit on it.

DIFFICULT TO INTERPRET RESULTS

Whether this showing is due to an actual improvement in operating conditions, a belated realization of the fruits of the numerous fare increases, or whether it is entirely due to the bad weather conditions prevailing in 1918, especially in the East, it is difficult to say, However, a few months will tell the story without doubt, for then the returns for the late spring and early summer months will be in and a comparison can be made that will not be rendered valueless by different weather conditions. At that time it will be possible to tell with some degree of accuracy the tendency of operating conditions.

As it is, there appear to be some encouraging signs, but the outlook is still far from bright. For the country as a whole the net income per car-mile decreased 6.50 per cent. This is the smallest decrease that has been recorded for many months. This good showing, however, is probably due entirely to conditions in the East where the heavy winter storms of 1918 brought operation almost to a standstill and made possible the apparent increase in net income in 1919. In the South and West, which were not so hard hit by the 1918 storms, the net income decreased 52.89 and 76.29 per cent respectively.

OPERATING REVENUES INCREASE

Operating revenues per car-mile for the country as a whole increased 14.20 per cent while the expenses increased 19.89 per cent. This showing is, comparatively speaking, not so bad, but again the apparent improvement is largely due to the weather conditions in 1918. In the East, where the storms were severest, the revenues actually increased more than the expenses, the amounts being 16.93 and 14.14 per cent respectively. This accounts for the favorable showing in this respect for the country as a whole, for in the South the increase in revenues per car-mile was 15.35 per cent and in expenses 33.92 per cent, while in the West the increase in revenues was 11.85 per cent and in expenses 22.16 per cent.

The operating ratio for the month also reflects the same situation. For the country as a whole it increased from 74.40 in February, 1918, to 77.20 in February, 1919. In the East it dropped from 82.00 to 80.05 during the same period, while in the South it rose from 60.09 to 70.70 and in the West it jumped from 68.75 to 75.00.

In Table IV the operating expenses per car-mile are shown in detail. An examination of them reveals some interesting facts. No single item in any section of the country shows a decrease except power in the East. This of course is due to the weather conditions in this district referred to again and again in the discussion of these tables. The amount of power produced was reduced and the overhead going on as before the cost of production per unit increased.

The high cost of materials is reflected in the equipment account. The cost per car-mile for this department increased 18.03 per cent for the country, rising from 3.16 cents per car-mile to 3.73 cents per car-mile. The greatest increase in this account is shown in the South, 55.31 per cent, while the greatest actual amount paid occurs in the East, 4.42 cents per car-mile for February, 1919, compared with 2.78 cents in the South and 3.25 cents in the West.

POWER COSTS INCREASE MODERATE

The increase in the cost of power per car-mile is moderate, being 6.18 per cent for the country and 9.45 per cent in the West, the East showing a decrease of 0.78 per cent, as before mentioned. In the South it is impossible to calculate the actual increase because many of the companies do not separate their power costs from the cost of conducting transportation.

The increase in the cost of conducting transportation is more uniform throughout the country than the increase in the other accounts, reflecting the general increase in the cost of labor. For the country the increase was 17.40 per cent per car-mile, while in the East the increase was 14.78 per cent, in the South 25.77 per cent and in the West 18.25 per cent. The figures for the South are complicated by the fact before mentioned that a number of companies include the cost of power in their transportation costs.

In Table V the combined income statement for February, 1919, of 189 companies is shown and the same statement is shown in cents per car-mile in Table VI. In the same way Table VII gives in detail the combined operating expenses of 161 companies for the same month, while in Table VIII these expenses are shown in cents per car-mile.

If reference is made to the similar tables for January, published in the issue of April 26, it will be seen that

### TABLE I—INCOME STATEMENT FOR FORTY-FOUR ELECTRIC RAILWAYS, FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

| | United States | | East | | South | | West | |
|---|---|---|---|---|---|---|---|---|
| | 1919 | 1918 | 1919 | 1918 | 1919 | 1918 | 1919 | 1918 |
| Operating revenue | $8,620,117 | $7,192,497 | $4,206,094 | $3,437,856 | $666,715 | $579,736 | $3,747,308 | $3,174,905 |
| Operating expenses | 6,645,641 | 5,354,115 | 3,367,478 | 2,820,804 | 471,674 | 353,040 | 2,806,489 | 2,180,271 |
| Net operating revenue | 1,974,476 | 1,838,382 | 838,616 | 617,052 | 195,041 | 226,696 | 940,819 | 994,634 |
| Net revenue from auxiliary operations | 79,188 | 723 | 54,447 | ........ | 11,148 | ........ | 13,593 | 723 |
| Taxes | 589,557 | 479,332 | 252,716 | 192,064 | 78,954 | 66,701 | 257,887 | 220,567 |
| Operating income | 1,464,107 | 1,359,773 | 640,347 | 424,988 | 127,235 | 159,995 | 696,525 | 774,790 |
| Non-operating income | 432,725 | 455,875 | 234,214 | 222,243 | 160,974 | 199,765 | 37,537 | 33,867 |
| Gross income | 1,896,832 | 1,815,648 | 874,561 | 647,231 | 288,209 | 359,760 | 734,062 | 808,657 |
| Deductions from gross income | 1,727,228 | 1,644,423 | 805,949 | 747,592 | 223,667 | 220,372 | 697,612 | 676,459 |
| Net income | 169,604 | 171,225 | 68,612 | *100,361 | 64,542 | 139,388 | 36,450 | 132,198 |
| Operating ratio (per cent) | 77.20 | 74.40 | 80.05 | 82.00 | 70.70 | 60.09 | 75.00 | 68.75 |
| Car-miles operated | 23,199,807 | 22,224,749 | 10,609,843 | 10,140,818 | 2,062,528 | 2,073,288 | 10,527,436 | 10,010,643 |

### TABLE II—INCOME STATEMENT IN CENTS PER CAR-MILE FOR THE FORTY-FOUR ELECTRIC RAILWAYS SHOWN IN TABLE I, FOR FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

| | United States | | | East | | | South | | | West | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1919 | 1918 | Per Cent Increase | 1919 | 1918 | Per Cent Increase | 1919 | 1918 | Per Cent Increase | 1919 | 1918 | Per Cent Increase |
| Operating revenue | 37.15 | 32.40 | 14.20 | 39.64 | 33.90 | 16.93 | 32.32 | 28.02 | 15.35 | 35.48 | 31.75 | 11.85 |
| Operating expenses | 28.65 | 24.10 | 19.89 | 31.73 | 27.80 | 14.14 | 22.82 | 17.04 | 33.92 | 26.63 | 21.80 | 22.16 |
| Net operating revenue | 8.50 | 8.30 | 2.40 | 7.91 | 6.10 | 29.67 | 9.50 | 10.98 | *13.47* | 8.85 | 9 95 | *11.06* |
| Net revenue from auxiliary operations | 0.34 | ..... | ..... | 0.51 | ..... | ..... | 0.54 | ..... | ..... | 0.13 | ..... | ..... |
| Taxes | 2.54 | 2.16 | 17.60 | 2.38 | 1.89 | 25.93 | 3.85 | 3.23 | 19.19 | 2.44 | 2.21 | 10.41 |
| Operating income | 6.30 | 6.14 | 2.65 | 6.04 | 4.21 | 43.47 | 6.19 | 7.75 | *20.13* | 6.54 | 7.75 | *15.61* |
| Non-operating income | 1.87 | 2.03 | *9.03* | 2.21 | 2.19 | 0.91 | 7.81 | 9.65 | *19.07* | 0.36 | 0.34 | 5.88 |
| Gross income | 8.17 | 8.17 | ..... | 8.25 | 6.40 | 28.91 | 14.00 | 17.40 | *19.54* | 6.90 | 8.09 | *14.71* |
| Deductions from gross income | 7.45 | 7.40 | 0.80 | 7.59 | 7.37 | 2.98 | 10.82 | 10.65 | 1.60 | 6.59 | 6.76 | *2.52* |
| Net income | 0.72 | 0.77 | *6.50* | 0.66 | *0.97 | ..... | 3.18 | 6.75 | *52.89* | 0.31 | 1.33 | *76.29* |
| Operating ratio (per cent) | 77.20 | 74.40 | 3.76 | 80.05 | 82.00 | *2.38* | 70.70 | 60.09 | 17.66 | 75.00 | 68.75 | 9.09 |
| Car-miles operated | 23,199,807 | 22,224,749 | 4.39 | 10,609,843 | 10,140,818 | 4.62 | 2,062,528 | 2,073,288 | *0.52* | 10,527,436 | 10,010,643 | 5.16 |

### TABLE III—OPERATING EXPENSES OF SIXTY COMPANIES FOR FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

| | United States | | East | | South | | West | |
|---|---|---|---|---|---|---|---|---|
| | 1919 | 1918 | 1919 | 1918 | 1919 | 1918 | 1919 | 1918 |
| Operating expenses | [1]$7,282,803 | [2]$6,076,555 | [3]$3,695,082 | [4]$3,295,669 | $650,021 | $482,441 | [5]$2,937,700 | [6]$2,298,445 |
| Way and structures | 740,318 | 613,141 | 389,820 | 350,242 | 65,629 | 43,821 | 284,869 | 219,078 |
| Equipment | 980,610 | 792,904 | 534,802 | 479,739 | 81,986 | 52,778 | 363,822 | 260,387 |
| Power | 1,308,135 | 1,178,188 | 773,087 | 739,970 | 42,932 | 8,511 | 492,116 | 429,707 |
| Conducting transportation | 3,081,010 | 2,512,877 | 1,475,444 | 1,220,887 | 359,547 | 285,996 | 1,246,019 | 1,005,994 |
| Traffic | 34,480 | 28,024 | 16,673 | 11,944 | 1,325 | 2,453 | 16,482 | 13,627 |
| General and miscellaneous | 1,004,187 | 927,509 | 484,722 | 473,278 | 98,602 | 88,882 | 420,863 | 365,349 |
| Transportation for investment—Cr. | *5,283* | *513* | ......... | ......... | ......... | ......... | *5,283* | *513* |
| Car-miles operated | 26,238,736 | 25,115,356 | 12,105,077 | 11,491,650 | 2,945,945 | 2,947,035 | 11,187,714 | 10,676,671 |

[1] Includes $139,346 for depreciation and other expenses not divided among sub-accounts. [2] Includes $24,425 for depreciation and other expenses not divided among sub-accounts. [3] Includes $20,534 for express department not divided among sub-accounts. [4] Includes $19,609 for express department not divided among sub-accounts. [5] Includes $118,812 depreciation not divided among sub-accounts. [6] Includes $4,816 depreciation not divided among sub-accounts.

### TABLE IV—OPERATING EXPENSES IN CENTS PER CAR-MILE FOR THE SIXTY COMPANIES SHOWN IN TABLE III, FOR FEBRUARY, 1919, COMPARED WITH FEBRUARY, 1918

| | United States | | | East | | | South | | | West | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1919 | 1918 | Per Cent Increase | 1919 | 1918 | Per Cent Increase | 1919 | 1918 | Per Cent Increase | 1919 | 1918 | Per Cent Increase |
| Operating expenses | [1] 27.74 | [2] 24.19 | 14.67 | [3] 30.53 | [4] 28.67 | 6.48 | 22.05 | 16.36 | 34.77 | [5] 26.25 | [6] 21.52 | 21.97 |
| Way and structures | 2.82 | 2.44 | 15.57 | 3.22 | 3.05 | 5.57 | 2.23 | 1.49 | 49.66 | 2.54 | 2.05 | 23.90 |
| Equipment | 3.73 | 3.16 | 18.03 | 4.42 | 4.17 | 5.99 | 2.78 | 1.79 | 55.31 | 3.25 | 2.43 | 33.74 |
| Power | 4.98 | 4.69 | 6.18 | 6.39 | 6.44 | 0.78 | [7] 1.46 | 0.29 | 403.44 | 4.40 | 4.02 | 9.45 |
| Conducting transportation | 11.74 | 10.00 | 17.40 | 12.19 | 10.62 | 14.78 | 12.20 | 9.70 | 25.77 | 11.14 | 9.42 | 18.25 |
| Traffic | 0.13 | 0.11 | 18.18 | 0.14 | 0.10 | 0.40 | 0.04 | 0.08 | *50 00* | 0.15 | 0.13 | 15.38 |
| General and miscellaneous | 3.[illegible] | 3.69 | 3.79 | 4.00 | 4.12 | *2.92* | 3.34 | 3.01 | 10.96 | 3.76 | 3.42 | 9.94 |
| Transportation for investment—Cr. | *0.02* | *0.002* | ..... | ......... | ......... | ..... | ......... | ......... | ...... | *0.05* | *0.005* | ..... |
| Car-miles operated | 26,238,736 | 25,115,356 | 4.47 | 12,105,077 | 11,491,650 | 5.34 | 2,945,945 | 2,947,035 | 0.04 | 11,187,714 | 10,676,671 | 4.79 |

[1] Includes 0.53 cent per car-mile for depreciation and other expenses not divided among sub-accounts. [2] Includes 0.10 cent per car-mile for depreciation and other expenses not divided among sub-accounts. [3] Includes 0.17 cent per car-mile for express department not divided among sub-accounts. [4] Includes 0.17 cent per car-mile for express department not divided among sub-accounts. [5] Includes 1.06 cents per car-mile for depreciation not divided among sub-accounts. [6] Includes 0.045 cent per car-mile for depreciation not divided among sub-accounts. [7] A number of companies in the South include the cost of power under conducting transportation which accounts for the apparent disparity in these figures.

### TABLE V—INCOME STATEMENT OF 139 COMPANIES FOR FEBRUARY, 1919

| | United States | East | South | West |
|---|---|---|---|---|
| Operating revenue | $22,147,896 | $15,419,533 | $1,620,154 | $5,108,209 |
| Operating expenses | 17,158,055 | 12,121,570 | 1,156,843 | 3,879,642 |
| Net operating revenue | 4,989,841 | 3,297,963 | 463,311 | 1,228,567 |
| Net revenue from auxiliary operations | 642,321 | 231,992 | 346,810 | 63,519 |
| Taxes | 1,560,884 | 1,047,919 | 182,339 | 330,626 |
| Operating income | 4,071,278 | 2,482,036 | 627,782 | 961,460 |
| Non-operating income | 785,533 | 521,583 | 173,928 | 90,022 |
| Gross income | 4,856,811 | 3,003,619 | 801,710 | 1,051,482 |
| Deductions from gross income | 5,116,063 | 3,526,954 | 570,494 | 1,018,615 |
| Net income | *259,252 | *523,335 | 231,216 | 32,867 |
| Operating ratio (per cent) | 77.47 | 78.61 | 71.40 | 75.95 |
| Car-miles operated | 56,777,307 | 37,093,849 | 4,895,502 | 14,787,956 |

### TABLE VI.—AMOUNTS PER CAR-MILE OF THE INCOME STATEMENT FOR THE 139 COMPANIES SHOWN IN TABLE V.

| | United States | East | South | West |
|---|---|---|---|---|
| Operating revenue | 39.01 | 41.57 | 33.09 | 34.54 |
| Operating expenses | 30.22 | 32.68 | 23.63 | 26.24 |
| Net operating revenue | 8.79 | 8.89 | 9.46 | 8.30 |
| Net revenue from auxiliary operations | 1.13 | 0.63 | 7.08 | 0.43 |
| Taxes | 2.75 | 2.83 | 3.72 | 2.24 |
| Operating income | 7.17 | 6.69 | 12.82 | 6.49 |
| Non-operating income | 1.38 | 1.41 | 3.55 | 0.61 |
| Gross income | 8.55 | 8.10 | 16.37 | 7.10 |
| Deductions from gross income | 9.01 | 9.51 | 11.65 | 6.89 |
| Net income | *0.46 | *1.41 | 4.72 | 0.21 |
| Operating ratio (per cent) | 77.47 | 78.61 | 71.40 | 75.95 |
| Car-miles operated | 56,777,307 | 37,093,849 | 4,895,502 | 14,787,956 |

NOTE.—* Indicates deficit. Figures in *italics* indicate decrease.

### TABLE VII—OPERATING EXPENSES OF 161 COMPANIES FOR FEBRUARY, 1919

| | United States | East | South | West |
|---|---|---|---|---|
| Operating expenses | [1]$18,096,936 | [2]$12,671,656 | $1,380,385 | [3]$4,044,895 |
| Way and structures | 1,873,395 | 1,281,194 | 155,909 | 436,292 |
| Equipment | 2,426,159 | 1,711,820 | 192,975 | 521,364 |
| Power | 2,897,474 | 2,115,692 | 118,570 | 663,212 |
| Conducting transportation | 7,952,987 | 5,534,126 | 705,948 | 1,712,913 |
| Traffic | 162,633 | 135,158 | 4,826 | 22,649 |
| General and miscellaneous | 2,448,681 | 1,670,854 | 202,157 | 575,670 |
| Transportation for investment—Cr. | *6,533* | *516* | ......... | *6,017* |
| Car-miles operated | 60,480,181 | 38,886,285 | 5,919,114 | 15,674,782 |

[1] Includes $342,140 depreciation not divided among sub-accounts. [2] Includes $223,328 depreciation not divided among sub-accounts. [3] Includes $118,812 depreciation not divided among sub-accounts.

### TABLE VIII—AMOUNTS IN CENTS PER CAR-MILE OF THE OPERATING EXPENSES OF THE 161 COMPANIES SHOWN IN TABLE VII, FOR FEBRUARY, 1919

| | United States | East | South | West |
|---|---|---|---|---|
| Operating expenses | [1]29.93 | [2]32.58 | 23.32 | [3]25.80 |
| Way and structures | 3.10 | 3.29 | 2.63 | 2.78 |
| Equipment | 4.01 | 4.40 | 3.26 | 3.33 |
| Power | 4.79 | 5.44 | 2.00 | 4.23 |
| Conducting transportation | 13.15 | 14.23 | 11.93 | 10.93 |
| Traffic | 0.27 | 0.35 | 0.08 | 0.14 |
| General and miscellaneous | 4.05 | 4.30 | 3.42 | 3.67 |
| Transportation for investment—Cr. | *0.01* | .......... | ......... | 0.04 |
| Car-miles operated | 60,480,181 | 38,886,285 | 5,919,114 | 15,674,782 |

[1] Includes 0.57 cent per car-mile for depreciation not divided among sub-accounts. [2] Includes 0.57 cent per car-mile for depreciation not divided among sub-accounts. [3] Includes 0.76 cent per car-mile for depreciation not divided among sub-accounts.

there is apparently a slight improvement shown in the figures for February. The revenue per car-mile increased, while the net loss per car-mile is considerably less.

### CLASSIFICATION UNCHANGED

As in the past the returns from city and interurban electric railways have been classified according to the following geographical grouping: Eastern district—East of the Mississippi River and north of the Ohio River. Southern district—South of the Ohio River and east of the Mississippi River. Western district—West of the Mississippi River. The tables showing the figures in detail are on page 1189.

## Company Accepts Valuation

### Minneapolis Street Railway Agrees to Council Figure of $24,000,000 with 7 Per Cent Return

The Minneapolis, (Minn.) Street Railway, included in the system of the Twin City Rapid Transit Company, on June 6 accepted the proposed $24,000,000 valuation of its property as a basis for a cost-of-service franchise with a 7 per cent annual return.

The Council has appropriated $1,500 for expenses in franchise draft and voted to employ B. J. Arnold, Chicago, Ill., to check over an item of $1,125,938 addition to the capital value of the company between Jan. 1, 1916, and Jan. 1, 1919, as stated by the directors of the company.

This amount was included in the company's offer of a valuation of $24,500,000 as subject to being verified, and is still subject to verification, although the compromise of $24,000,000 has been accepted. If this verification is not made the figure of $24,000,000 will be lowered. Otherwise it will remain as the franchise basis.

### PRESIDENT LOWRY'S LETTER

The letter of acceptance of the valuation by the company, signed by Horace Lowry, president of the railway, read in part:

> The report of your special committee on street railway matters and extensions adopted May 29, offering this company a valuation of $24,000,000 for its property for a franchise, rate making and purchase purposes, with a maximum rate of return thereon of 7 per cent per annum and providing for compensating this company for procuring new money required for future extensions has been duly submitted to and considered by the board of directors of this company.
>
> I am authorized to state that in the opinion of the board of directors said valuation is less than the fair value of the property as of Jan. 1, 1919, and that the return to the company therein provided will not sufficiently compensate the stockholders whose money has been invested in the development of the property.
>
> Fully appreciating, however, the great value to the community of having the franchise negotiations completed without further delay and railway service restored to its former high standard, and believing that under a modern cost-of-service franchise there will be close co-operation between the city and this company, the board of directors have authorized me to accept the offer of your honorable body as set forth in the report of your special committee on railway matters and extensions and the same is hereby accepted.

City Attorney C. D. Gould expects to be able to present a franchise draft to the City Council by July 1. He has been working on it several months. Changing conditions have required practically an entirely new draft and the attorney will devote his entire time to the work. One of the features that makes the work more difficult is the relationship between the Minneapolis Street Railway and the St. Paul Street Railway, both controlled by the Twin City Rapid Transit Company. There are now four interurban lines with 10-cent fares between the cities, and the spread of the halves of the fare is an intricate question under two franchises and two different Councils. The St. Paul franchise permits no increase in the 5-cent fare locally without vote of the people. It is said by Minneapolis officials that the Minneapolis end is carrying an unequal burden of the cost of the service as related to revenue.

## Protest Against Abandonment

The application of the Union Savings Bank & Trust Company, Cincinnati, Ohio, as trustee for the holders of the first mortgage bonds of the Cincinnati & Columbus Traction Company to discontinue the service and operation of the company, was heard recently by the Public Utilities commission. W. S. Little, attorney, representing the bank, declared the road was operating at an approximate loss of $2,300 a month, and consequently could not be expected to continue in operation indefinitely.

Citizens who reside along the road maintained that discontinuance would abrogate certain contract rights and would work great damage and inconvenience to citizens who have been accustomed to use the road for passenger and freight purposes.

## Kansas Assessments Announced

Samuel T. Howe, chairman of the State Tax Commission of Kansas, is one of the officials of that State who is fully aware of the plight of the electric railways. He has seen a decrease in utility values for the year of $1,645,370, of which the street and interurban railway loss is $622,611. Of these properties he said recently:

> One company, the property of which was assessed by the state board in 1918 at $147,740, was assessed this year at $75,000. This company is bankrupt. A mortgage was foreclosed and the property was bid in at the master's sale at the amount at which it is assessed, and at the sale were proprietors of other companies who were bidding on the property of this company for junk purposes.
>
> The railway in Fort Scott has been abandoned. The rails remain in the streets because they are not worth removing.
>
> Practically the same is true as to the city of Parsons. The street railway there has been trying to give its property to the city. The investment is practically lost, and so of others which might be mentioned.
>
> The Kansas City Railways shows a loss of $188,336, chiefly on the lessened value of its rolling stock used in the state.
>
> In only a few instances—and these exceptional as to traffic conditions—have the properties remained as valuable as they were a year ago.

## Subsidy for Summer Resort Railway

Following a conference between city officials of Ocean City, N. J., and representatives of the Ocean City Electric Railroad it was decided by the former to make application to the Court of Chancery for the appointment of a trustee to operate the road during the present summer. It is expected that cars will be running over the line again in a short time. The company's representatives has previously declared that it was not the purpose of the corporation to operate the line this season.

The city will accordingly run the road during the summer and if there is a deficit when the summer season is closed the sum will have to be made up by the city. The average loss to the company in operating the road during the past two or three years has been about $175 a year. When the railway announced that it could no longer operate the road the city authorities decided that the suspension of service would injure business during the summer and adopted the plan of guaranteeing the company against loss.

The conference at which arrangements were made for operating the road was held in Philadelphia and was attended by Mayor Champion and the city commissioners of Ocean City, City Solicitor Boswell, for the city, and Daniel Steelman and William G. Moore, a committee representing bondholders of the company, William D. Sherrerd, secretary of the company, and J. Fithian Tatem, solicitor for the corporation.

Chancellor Edwin Robert Walker at Trenton has appointed William E. Massey, Ocean City, as trustee to operate the Ocean City Railway, until October 1, next. Mr. Massey is to serve without compensation and is allowed to spend $5,000 on repairs and improvements. He is under $10,000 bonds and must turn the road back to the company in as good a condition as it was when it was turned over to him.

## Eastern Massachusetts Street Railway Succeeds Bay State

The Eastern Massachusetts Street Railway succeeded the Bay State Street Railway at Boston on June 1 and the system is now being operated by public trustees in accordance with recent legislation. Homer Loring, Boston, a pioneer in service-at-cost legislation, is chairman of the trustees, hte others being Arthur G. Wadleigh, Frederick J. Crowley, Isaac Sprague and Earle P. Charlton. Under the public control act fares must be established on a service-at-cost basis within sixty days. The trustees gave an open hearing upon the road's problems at Boston on June 6, at which Chairman Loring stated that the estimated deficit for the first year of public operation under present fares is $2,083,700. The trustees plan hearings in the communities served by the road in advance of the fare determination.

# Financial News Notes

**West End Will Refund Notes.**—The West End Street Railway, Boston, Mass., operated under lease by the Boston Elevated Railway, has petitioned the Massachusetts Public Service Commission for permission to issue refunding bonds to the amount of $1,581,000 to take the place of three-year notes issued on Aug. 1, 1916.

**Connecticut Line Leased.** — The Hartford & Springfield Street Railway, Warehouse Point, Conn., has completed arrangements whereby it will operate the Suffield Street Railway, which extends from Spencer's Corner, Suffield to the State line. The road will be operated under a lease from the Connecticut Company.

**Additional Monongahela Notes.**—A banking syndicate headed by the Fidelity Trust Company, Baltimore, Md., is offering at 99 and interest, to yield 7⅛ per cent, $2,000,000 one-year 6 per cent notse of the Monongahela Valley Traction Company, Fairmont, W. Va., proceeds to be applied to the completion of payments on a power plant costing $3,000,000, extensions, etc.

**Car Trust Certificates Authorized.**—The Tennessee Railroad & Public Utilities Commission has authorized the Nashville Railway & Light Company to purchase ten new cars, estimated to ost about $57,980. The company will ssue car trust certificates for $33,425 of this amount. The cars, it is stated, will be purchased from the American Car Company, St. Louis, Mo.

**Protests Against Receiver's Certifi-ates.**—An appeal from the order of ederal Judge Julius M. Mayer authorzing the issuance of $20,000,000 of reeiver's certificates by the Brooklyn (N. .) Rapid Transit Company has been led by the Central Union Trust Comany, New York. The appeal has been et for argument before the United tates Circuit Court of Appeals on une 18.

**Offers Northern Ohio Bonds.**—The National City Company, New York, N. Y., is offering for subscription at 96 and interest to yield about 6⅔ per cent $4,600,000 of seven-year 6 per cent secured gold bonds of the Northern Ohio Traction & Light Company, Akron, Ohio, dated June 1, 1919, and due June 1, 1926. The interest on these bonds is payable on June 1 and Dec. 1. The bonds are in denominations of $1,000, $500 and $100.

**Sale of Illinois Road Postponed.**—The sale of the assets of the Southern Traction Company, East St. Louis, Ill., announced for June 10, has been postponed until July, the exact date not having been determined yet, on an order entered in the United States District Court at Urbana by Federal Judge English. The order stipulates that the entire purchase price shall be paid in cash. The road was promoted by the Lorimer interests and was built in part, but it was never operated.

**Interest Unpaid on Washington Utilities Notes.**—The interest due on June 1, on the 5 per cent collateral trust notes of the Washington (D. C.) Utilities Company remains unpaid. The holders of the notes are asked to deposit them with the American Security & Trust Company, or the Metropolitan Trust Company, New York, N. Y. The notes are secured by $2,750,000 of stock of the Washington Railway & Electric Company, which company passed the May 1, 1919, dividend.

**Authorized New Orleans Interest Payment.**—Judge Foster in the United States District Court at New Orleans, La., on May 29, ordered J. D. O'Keefe, receiver of the New Orleans Railway & Light Company, New Orleans, La., to pay $28,482 interest due on June 1 on the $1,000,000 loan by the War Finance Board. The principal of the loan was also due on June 1, but the War Finance Board has expressed its willingness not to press the payment of the principal at this time. The total of the debt has been reduced to $940,000, bonds to the extent of $60,000 having been retired.

**Suggests Successor as Receiver.**—Former Judge Clarence L. Cole, appointed receiver of the Atlantic Shore Railway, Atlantic City, N. J., three years ago, has asked to be relieved of the office, and suggests that A. J. Purinton, superintendent of the system, be named as his successor. The company was forced into the hands of a receiver by the keen competition of the jitneys. The city came to the rescue of the railway by passing an ordinance prohibiting jitneys from operating along Atlantic Avenue, the principal thoroughfare of the city. The prospects are said to be good for lifting the receivership soon.

**Abandonment Approved.**—By a vote of five to three, the City Council of Seattle, Wash., sustained Thomas F. Murphine, superintendent of public utilities, in suspension of operation on the two-block shuttle line on Queen Anne Hill, known as the Ray Street line. The service was discontinued when Mr. Murphine adopted the policy of cutting out the nonpaying railway lines, especially where only a few patrons were served. It is proposed to discontinue other service that does not produce revenue, and the Council's action is regarded as an indication that Mr. Murphine is to be given practically a free hand in managing the Municipal Railway.

**Short Bond Extension Planned.**—An effort is being made to extend for fourteen months the $95,000 of first mortgage 5 per cent bonds of the Ohio Central Traction Company, assumed in the consolidation with the Cleveland, Southwestern & Columbus Railway, Cleveland. This would make the bonds mature on Aug. 1, 1920, at which time the company has other maturing issues. As consideration, the company proposes to make an immediate cash payment of $23.33 on each $1,000 bond and to attach three new coupons at the rate of 5 per cent, said coupons maturing on Dec. 1, 1919, June 1, 1920, and Aug. 1, 1920. Thus, the bonds will net the holders 7 per cent during the period of the extension. The priority of the lien will be preserved in every respect. Of the original issue of $200,000, all but $95,000 have been paid or exchanged for other bonds maturing in 1923. Those holders who assent to the plan are asked to deposit with the New Haven Trust Company, trustee, New Haven, Conn. With the war financing out of the way, the company believes it will have no difficulty in paying the bonds on Aug. 1, 1920.

## Electric Railway Monthly Earnings

CITIES SERVICE COMPANY, NEW YORK, N. Y.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| n., Apr., '19 | $1,807,255 | $63,076 | $1,744,179 | $172,745 | 1,571,434 |
| n., Apr., '18 | 1,885,750 | 37,254 | 1,848,496 | 212 | 1,848,284 |
| n., Apr., '19 | 21,913,980 | 628,793 | 21,285,187 | 872,653 | 20,412,534 |
| n., Apr., '18 | 20,127,716 | 380,001 | 19,747,715 | 2,635 | 19,745,080 |

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| Mar., '19 | $49,158 | *$34,224 | $14,934 | $14,245 | $688 |
| Mar., '18 | 42,252 | *27,210 | 15,042 | 11,421 | 3,621 |
| Mar., '19 | 140,960 | *99,848 | 41,112 | 46,625 | †5,513 |
| Mar., '18 | 118,422 | *81,683 | 36,739 | 34,062 | 2,677 |

NTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| ., Apr., '19 | $4,015,036 | †$2,576,126 | $1,438,910 | $1,608,375 | †$120,707 |
| ., Apr., '18 | 3,539,667 | *2,043,570 | 1,326,097 | 1,160,311 | 386.551 |
| ., Apr., '19 | 35,375,195 | *24,231,933 | 11,043,262 | 14,992,651 | †3,457,801 |
| ., Apr., '18 | 33,683,685 | *30,577,207 | 3,106,478 | 11,179,186 | 4,043,285 |

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Mar., '19 | $185,807 | *$142,176 | $43,631 | $35,988 | $7,643 |
| 1m., Mar., '18 | 164,940 | *121,542 | 43,398 | 36,228 | 7,170 |
| 3m., Mar., '19 | 551,677 | *435,383 | 116,294 | 107,833 | 8,461 |
| 3m., Mar., '18 | 447,657 | *348,220 | 99,437 | 108,650 | †9,213 |

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | 493,363 | *$349,797 | *143,566 | $114,036 | ‡$35,515 |
| 1m., Apr,, '18 | 463,194 | *331,863 | 131,330 | 102,783 | ‡34,238 |
| 4m., Apr., '19 | 2,046,030 | *1,480,041 | 566,090 | 455,306 | ‡134,774 |
| 4m., Apr., '18 | 1,889,226 | *1,385,342 | 503,884 | 401,355 | ‡138,872 |

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $882,220 | $619,380 | $262,840 | $157,420 | $105,420 |
| 1m., Apr., '18 | 776,967 | 555,212 | 221,755 | 155,561 | 66,194 |
| 1m., Apr., '19 | 3,500,724 | 2,595,773 | 904,951 | 628,921 | 276,030 |
| 4m., Apr., '18 | 3,234,357 | 2,436,302 | 798,055 | 6 1,690 | 176,365 |

*Includes taxes. †Deficit ‡Includes non-operating income.

# Traffic and Transportation

## Protests Fare Reduction

### Galveston Company Contends There Has Been No Change from War Conditions

Luke C. Bradley, district manager of Stone & Webster, and formerly manager of the Galveston (Tex.) Electric Company, presented to the Mayor and City Commissioners on June 4 a statement giving the reasons of the company for combatting the proposal to reduce fares in Galveston from 6 to 5 cents.

Mr. Bradley showed that 291 American cities had come to the rescue of the electric railways by permitting increases in fare and declared that in not a single instance have these rates been reduced, as the conditions which rendered them necessary still obtain.

He showed that the increase of 1 cent in the Galveston fare had resulted in an increase of $80,500 a year in revenue and that the increase in wages of motormen and conductors, based on the 6-cent fare, amounted to $82,545, or $2,045 more than the increase produced, demonstrating that every cent of the increase was applied to local wages.

#### PLATFORM EXPENSE HAS DOUBLED

Before the days of the high cost of living, Mr. Bradley said, the company paid conductors and motormen $93,625 a year, while now they are paid $176,170. In addition, wages to other employees have been raised $33,400 a year.

A statement was submitted, showing the cash actually invested in the property to be $2,083,331. The earnings of the company, after taxes and depreciation, under a 6-cent fare, yield only 4 per cent return on this money.

Mr. Bradley deprecated any effort to inject prejudice into the discussion and warned that unfair treatment of the company would be a bad way to attract capital, which is essential to the upbuilding of a great city, and asserted that it was an established fact that the electric railway problem is the greatest facing American cities to-day, and that these problems are only to be solved by co-operation on the part of the cities, their people and the electric railways in a co-ordination of effort to reach a right and fair solution. In this connection he said:

> If this fare is reduced in Galveston, it will be the first step toward destroying this property. If an ordinance is passed repealing the 6-cent fare under the conditions which exist to-day, it will stand as the most unfair ordinance ever passed in the history of the city of Galveston since its incorporation. It cannot from any viewpoint be based upon even the suggestion of fairness, and if you commissioners believe in fair play, as I know you do, if you believe in rendering a service to Galveston, if you do not wish to destroy one of the best citizens that Galveston ever had, you cannot, in fairness, reduce this fare.

In closing his communication Mr. Bradley said:

> As the newly elected officials of this city it is your duty to investigate fully the affairs of the city. It is your duty to know the truth. If further investigation of facts in connection with this matter is necessary, it is your duty to make it, and we will give you every facility for doing so.
>
> We stand ready to go hand in hand with Galveston to the greatest destiny the most optimistic of you can hope for. We stand ready to do our full share. We have always done this and we do not now shirk our duty. All we ask is that the employees of this company be protected, and the money which we have invested here safeguarded and a fair return on that investment assured. No thoughtful man can deny the justice of this position, and certainly no money can be obtained to do our part without such assurances.
>
> We have full confidence in the justice and fairness of the people of Galveston and I am glad of this opportunity to present to you the truth and the facts in the case.

## Express Rates in Indiana

Ten interurban properties in Indiana were authorized on June 3 by the Public Service Commission to establish local and interline express rates, the new rates to be filed after five days' notice. These express service rates are established on the basis of 150 per cent of first class rates for local traffic and 120 per cent of the local rate for interline traffic, and are computed on the disque scale. The minimum charge for local express, as established by the order of the commission, is 25 cents, and the minimum charge for interline 35 cents.

The order of the commission was made on petition of the various electric railways for merchants' dispatch rates, on account of the fact that the contracts between these companies and the old line express companies were canceled after the express companies were taken over by the federal authorities. The order of the commission also authorized the interurban lines to establish commodity rates on such articles as ice-cream packers and bread baskets.

The express rates, as prescribed by the order, are to be the maximum and will apply to all articles rated in official classification at higher than first class as well as articles of first class and lower. It is also provided in the order that express shipments shall be routed by the shortest and cheapest route.

The companies authorized to establish the express rates are the Fort Wayne & Decatur Traction Company, Fort Wayne & Northern Indiana Traction Company, Indianapolis & Cincinnati Traction Company, Terre Haute, Indianapolis & Eastern Traction Company, Union Traction Company of Indiana, Interstate Public Service Commission, Marion & Bluffton Traction Company, Fort Wayne & Northwestern Railway, Winona Interurban Railway and the Indiana Railways & Light Company.

## Jersey Case Near Close

### Witness for State Commission Develops Difference of Opinion from Plan Proposed by Railway

The Board of Public Utility Commissioners of New Jersey concluded on June 9 the examination of its own witnesses in connection with the application of the Public Service Railway for permission to establish zone fares. It was decided then to put the hearings over until June 23, when the League of Municipalities will begin the presentation of its case.

Dugald C. Jackson continued his testimony before the commission on June 6. He suggested that the first 5-cent fare cover two zones instead of one as proposed by the company. Unnecessary antagonism of the company's patrons would be worse for the company than the loss of a few hundred thousand dollars by a modification of the zone plan as submitted. Thomas N. McCarter, president of the railway, asked whether it wouldn't be better to get the revenue and antagonize the public than to let the company die. Mr. Jackson didn't think that the company would die. It was his opinion that at the end of six months' trial people would readily consent to a readjustment if they had been convinced in the meantime that the company was doing its best to give all it could for the money and make a reasonable profit.

It was Mr. Jackson's opinion that the fare matter could not be settled once and for all, as conditions were changing constantly. He said that so long as the business continued to grow it would be necessary to experiment with changes in fare. Mr. Jackson said that the shorter zones would be preferable to the 5-cent charge for the first two zones because the relatively short riders would get their rides for a nickel and this would benefit the company by competing directly with the jitneys. The more people who used the cars the more it was to the public's advantage as well as the company's. The two went hand in hand.

Mr. Jackson said his views on the so-called standby and movement charges were somewhat different from those of the company. It would be for the benefit of the passengers if all cars were through cars. The fact that the company did not have to supply through cars on all lines and could not do so showed that transfers were a distinct benefit to the company. He did not think that this should be a charge against the passenger.

According to Mr. Jackson, no electric railway could relieve itself of serious competition from jitneys unless people felt that they were getting as much for their money on the cars as they did on the jitneys. It was important for the company to see the problem from the point of view of its customers. Mr. Jackson agreed with Mr. McCarter that it would be serious to take $750,000 prospective revenue out of the company's plan, but even that would not be without its advantages.

The examination of Mr. Jackson on June 9 had to do very largely with the effect of fare changes on community development. Mr. Jackson said that where a low fare had been established to encourage suburban development there should be a careful review and study before fares were changed, so as to learn whether circumstances had changed.

He explained that there was a time when the flat rate of fare had been urged in favor of the development of suburban sections and for the prevention of traffic and living congestion, but that conditions in American cities had proved that the flat fare had not eliminated congestion. In reviewing changed suburban conditions, he thought that three factors should be taken into consideration, namely, the citizens' investment in real estate, the citizens' investment in the electric railway and the general and special interests of the entire community.

## Wants Municipal Fare Increased

### Seattle Councilman Sees Need Now, but Railway Official Wants Present Fare Continued Six Months

Councilman R. H. Thomson of Seattle, Wash., has expressed the belief that the fare on the Seattle Municipal Railway should be increased to 6 cents. Thomas F. Murphine, superintendent of public utilities, asserts that it will be time enough to talk increased fares when it has been demonstrated that the city cannot operate the railway on a 5-cent fare. One reason for Councilman Thomson's proposal to increase the fare is the recent advance allowed by the Public Service Commission on the Seattle & Rainier Valley lines.

Mr. Murphine says that the statement of expenses and revenues in April referred to in detail on page 1187 shows that the city made money on a 5-cent fare. When certain proposed changes are put into effect, he asserts that operating costs will be reduced, and that earnings will show an excess of at least $50,000 monthly over expenses. Mr. Murphine believes that operation on a 5-cent basis should be continued at least six months before any move toward increased fare is made.

Beginning on June 1, passengers on the Seattle & Rainier Valley Railway and the Greenwood Avenue lines (operated by the Washington Water Power Company), both in Seattle, began to pay increased fares.

As explained elsewhere in this issue, the Rainier Valley lines charge 6 cents for a straight ride in the city limits as far south as Seventy-fifth Street, with 1 cent additional for every transfer issued, and 2 cents for transfers received from other lines.

The Greenwood Avenue fare is advanced by the discontinuance of the city custom of accepting transfers from that line to the city cars. The transfers have been ordered discontinued because Mr. Murphine found that the city was carrying the big end of the load on a 50-50 division of the receipts.

## Fares Up in 388 Cities

### More Than Fifty-five Per Cent of the Urban Population of United States Paying Increase

Since the publication by the American Electric Railway Association in March of the fare increases in the cities of the United States, several additions and changes have become effective. The fare in New Jersey cities served by the Public Service Railway has been reduced to 6 cents and again advanced to its former level, 7 cents, plus 1 cent for a transfer. Three hundred eighty-nine cities having more than 55 per cent of the urban population of the country are now paying increased rates. Of this total, twenty-nine cities are paying a 10-cent fare; nineteen an 8-cent fare; 100 a 7-cent fare, seventeen of which pay an additional 1 cent for each transfer; and 164 are paying a 6-cent fare. Fares in the remainder have been increased either by a reduction in the length of zones, the adoption of a zone system, the abolition of reduced rate tickets, or a charge for a transfer. The situation throughout the country is summarized in the accompanying table:

| | No. of Cities | Per Cent of Urban Pop. of U. S. | Average Population |
|---|---|---|---|
| otal number of cities in which increases were granted. (Population for four citiesmissing).. | 388 | 54.75 | 60,366 |
| ranted since Jan. 1, 1918. (Population for four cities missing).... | 347 | 50.82 | 62,653 |
| anted prior to Jan. 1, 1918.................. | 41 | 3.93 | 41,015 |

Note—The population figures used in this summary the U. S. Census figures for July 1, 1917; the imated urban population is 42,778,287. The total mber of cities given (389) is the sum of cities in ich fare increases were granted and excludes four plications.

The nature of the increases in fare shown in the following table:

| | No. of Cities | Average Population |
|---|---|---|
| ies in which the fare was increased to 10 cents cash; ticket are, 7 cents for city zone; 5 ents in each two-mile suburban nd interurban zone; minimum are, 10 cents.................... | 23 | 44,464 |
| ities in which the fare was increased to 8 cents.............. | 19 | 75,600 |
| Cities in which the fare is 7 cents nd 1 cent charge for each ansfer.................... | 17 | 91,958 |
| Cities in which the fare was increased to 7 cents (population r two cities missing).......... | 83 | 21,815 |
| Cities in which the fare was increased to 6 cents.............. | 164 | 67,653 |
| *Cities in which the reduced-rate tickets have been abolished (population for two cities missing).......................... | 52 | 53,839 |
| Cities in which a straight 5-cent fare is being charged with an additional charge for transfers... | 6 | 100,442 |
| Cities having a 5-cent two-mile zone—next zone 5 cents for 1¾ miles, 5 cents for each 1¾ miles thereafter—1 cent transfer charge.......................... | 5 | 83,760 |
| Cities in which the fare was increased to 10 cents........... | 6 | 11,293 |
| Cities having a 5-cent central zone, 2-cent outside zone........... | 4 | 126,143 |
| Cities having 6-cent zones........ | 3 | 52,462 |
| Cities in which a 5-cent farei s being charged, with an additional charge of 5 cents for each zone outside city.................. | | 21,561 |
| Cities having a 6-cent central zone, 2 cents outside................ | 1 | 64,720 |
| Cities having a 7-cent inner zone, 5-cent outer zone and 10 cents between..................... | 1 | 66,503 |
| Cities having a 5-cent central zone, 7-cent outside zone, overlapping central zone................... | 1 | 586,196 |
| Cities having a 5-cent central zone, 3 cents per mile outside......... | 1 | 535,485 |
| Cities in which a 5-cent fare is being charged, with an additional charge of 1 cent for rides outside of city.......................... | 1 | 38,272 |
| Cities in which a 10-cent fare is charged for Owl Service, day fare 5 cents....................... | 1 | 58,716 |
| Cities in which the price of reduced rate tickets were increased from 8 for 25 cents to 6 for 25 cents, cash fare 5 cents............... | 1 | 220,135 |
| Cities in which the fare was increased by adding a 5-cent charge for rides outside of city limits.......................... | 2 | 70,528 |

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Three cities, total population 140,808, served by Bay State Street Railway, included in fourth group.

* One city also included in six-cent group.

## Detroit Decision Basis for Toledo Fare Ruling

The Federal Court of Appeals at Cincinnati, Ohio, has handed down an opinion in the appeal of the city of Toledo vs. the Toledo Railways & Light Company affirming the injunction decree of District Federal Judge Killits, of Toledo, restraining the city of Toledo from interfering with the company's operation of its lines in Toledo and the collection of fare at the rate of 5 cents for adults and 1 cent additional for a transfer.

In passing upon the case, the court says the injunction decree appealed does not operate to interfere with the right of the city to pass proper legislation to regulate the fares, nor does it prohibit the city from passing ordinances directing the railway to vacate the streets, remove its rails and prescribe regulations for such removal. Neither does the court prevent the city from fixing fares and provide for exclusion of the company from the use of Toledo streets in the event the rates so fixed are not accepted.

In the opinion handed down, Judge Dennison wrote as follows:

> Upon this record, and in this court, the city does not undertake to dispute the claim of the company that any rates or fare less than the proposed new schedule would have been confiscatory, and, if enforced against the company, would have been a taking of its property without justification, and would violate its constitutional rights.
>
> By the line of decisions of the Supreme Court, culminating in the Denver Water Company and the Detroit United Railway cases, it now is clearly settled that when the franchise rights of a public service corporation to use the streets of a city expire, the city has the absolute right to order the discontinuance of the service and the removal of property from the streets; that the company has a corresponding right to make such discontinuance and removal, but that if neither party exercises this right and if the company, at the city's request, continues to occupy the streets and

to give service, the public regulating power can be exercised only subject to the condition that it must not bring about confiscation.

The decision in the Detroit case, to which reference is made, was reviewed at length in the ELECTRIC RAILWAY JOURNAL for Jan. 18, page 149. In the Detroit decision the Supreme Court said that the city could have ordered the tracks from the street after the franchise expired, but that the city can not compel the company to continue business at a loss.

## Increase for Seattle Line

The Public Service Commission of the State of Washington has ruled that the Seattle & Rainier Valley Railway may charge 6 cents for a straight ride, 1 cent additional for every transfer issued, and 2 cents for every transfer accepted from other lines.

The city opposed the increase. It was represented at the hearing by Thomas J. L. Kennedy, assistant corporation counsel, and E. E. O'Brien, assistant superintendent of utilities.

The company introduced evidence to show that in 1918 it earned considerably less than 1 per cent on a valuation of $1,437,271; that wage increases of $30,000 a year to its employees will be required at once to put them on the same basis as the employees of the Seattle Municipal Railway.

The straight 6-cent fare applies only as far south at Seventy-fifth Street, South. The rate to Benton is 15 cents, or 25 cents for the round trip. Five cents is charged from Seventy-fifth Street to Bryn Mawr. School tickets are increased from 2½ cents to 3 cents. The new rates were scheduled to go into effect on June 1.

## New York City Commissioner Sees the Need

Lewis Nixon, making his first public address since his appointment to the Public Service Commission for the First District of New York, told the Brooklyn Chamber of Commerce, on May 28, that he was going to prevent any more receiverships in Greater New York if possible. He is reported to have said:

> Neither this state nor this country can afford many more receiverships. If we have many more of them there is no doubt but that it will mean countrywide disaster. I will do everything in my power to prevent any trouble which might lead to disaster. We must face at once a fair discussion and follow that up with a fair adjustment.
>
> The situation has been forced upon us entirely by the war. We are carrying people, now in New York City at a rate of actual cost. I want to meet every one and try to arrive at a fair decision concerning this matter.
>
> There was a day when every one that drew a contract for transit thought that a 5-cent fare was a gold mine, and it was. If we had not had war we would not now face the situation which we are facing, but in the face of things as they are one side must give up something and so must the other side.

Mr. Nixon said that he thought the peak of high cost in operation had been reached in the last quarter of 1918 and that an improvement is now taking place.

# Transportation News Notes

**Ten-Cent Owl Fare.**—The Johnstown (Pa.) Traction Company will raise its fare from 5 cents to 6 cents and start a 10-cent night fare on June 15. It has filed notice of the increase with the Public Service Commission of Pennsylvania.

**Publicity for Fare Appeal.**—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has undertaken a campaign of publicity in connection with its appeal for an increase in its city fares in Terre Haute.

**Protest Johnstown Increase.**—The special committee of citizens of Johnstown, Pa., organized to protest against the Johnstown Traction Company's increase of fare from 5 cents to 6 cents, will carry their case to the Public Service Commission. The new rate is effective on June 15.

**Fare Application Denied.**—Representatives of the United Railways & Electric Company, Baltimore, Md., personally appealed to the Public Service Commission to permit the new fare increase—four tickets for 25 cents, or 7 cents for a cash fare—to go into immediate effect. The present fare is 6 cents. The appeal was refused. The action of the commission was unanimous.

**Campaign Against Trading in Transfers.**—Arrests are being made by detectives in the employ of the Minneapolis (Minn.) Street Railway in an attempt to curb trading in transfers. In several large buildings transfers are left on window ledges where they are overhauled and used illegitimately by other persons. Fines are being assessed by the city judge. This has tended to break up these clearing houses for transfers.

**Weekly Bulletin for Atlanta Patrons.**—Plans are being worked out for the publication by the Georgia Railway & Power Company, Atlanta, Ga., beginning at an early date, of a weekly four-page bulletin for distribution among its passengers. The bulletin will be distributed among racks in the cars, the passengers being invited to help themselves. According to preliminary estimates, between 50,000 and 100,000 copies weekly will be required.

**Service and Fare Matters Still Unsettled.**—The Council of Louisville, Ky., has voted against the ordinance permitting the Louisville Railway to curtail service on certain lines, proposed by Mayor Smith in lieu of an increase in fares from 5 to 6 cents. The Mayor declined to consider a request for increased fares and following action of the Council said that having done all he could, he had "washed his hands of the whole matter." This matter has been referred to at length previously in the ELECTRIC RAILWAY JOURNAL.

**Number of Zones Increased.**—In an effort to prevent further operating deficits, the Milford, Attleboro & Woonsocket Street Railway, Milford, Mass., has, with the consent of the Public Service Commission, reduced its unit fare rate from 7 cents to 5 cents, but has increased the number of fare zones from seven to eleven. Under the old system, the zones averaged approximately 3 miles each; under the new arrangement they will approximate about 2 miles each. The road last year failed by more than $8,000 to earn operating expenses.

**Six Cents in Peoria.**—The Public Utilities Commision of Illinois has entered an order allowing the Peoria Railway to charge a 6-cent fare in the city of Peoria and suburbs, effective on June 7, to continue one year. At that time the fare will automatically revert to 5 cents a ride and twelve rides for 50 cents unless otherwise ordered by the commission. Immediately following receipt of the order the company signed an agreement with its employees granting them an increase of 8 cents an hour, dating from May 1, 1919. The City Council had recently gone on record against the increase in fare from 5 cents to 6 cents.

**Staggered Hours Abandoned.**—Following ineffectual attempts on the part of the commissioners of the District of Columbia as members of the Public Utilities Commission, to persuade the various other government departments to "stagger" the hours of opening, employees of the District government have resumed the old 9 o'clock opening hour. Ever since the influenza epidemic of last fall they have been reporting at 9:30 o'clock and working half an hour later in the afternoon. The District government was the last of the government departments to abandon the "staggered" hours schedule and did so reluctantly.

**Jitney Competition Very Serious.**—The Public Service Railway, Newark, N. J., has served notice on the Board of Public Utility Commissioners of a plan to abandon the Bay Avenue portion of its Bloomfield line, the change to become effective on June 17. Should the commission object to the proposal, a hearing to test the necessity for the move probably will result. According to the company, the revenue return does not justify the continuation of the service. It is said that nearly all the traffic of the Bay Avenue line has been taken by the jitneys, except during rush hours. The railway proposes an alternative service for those who would be affected by the abandonment. This alternative service provides for change of cars. Court action will be resorted to by the Bloomfield Town Council in an effort to compel the railway to continue the Bay Avenue service if the company withdraws service by June 17.

# Personal Mention

## Mr. Maher Chosen

### ice-President and Manager of Third Avenue Railway Will Head New York Association

At the annual meeting of the New ork Electric Railway Association, held t Lake George on June 7, Edward A. laher, Jr., vice-president and general anager of the Third Avenue Railway, ew York, was elected president. Mr. aher has been vice-president of the ssociation during the past year, which as been a strenuous one for the railays in the State. During this time r. Maher has given a great deal of s time to the association and has lped greatly to advance its interest. The history of the Maher family has

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E. A. MAHER, JR.

h very closely identified with the way interests of New York for the twenty-seven years. In 1892, Ed- d A. Maher, Sr., who had recently red as Mayor of Albany and then served a short time as president of Albany Electric Illuminating Com- y, was invited to come to New York ecome president of the Union Rail- Soon after it was electrified un- his administration, and on the con- ation of the railway with the Third ue Railroad he became vice-presi- and general manager and later dent of that company.

ward A. Maher, Jr., his son and subject of this sketch, was born lbany in 1873, and after gradua- from the Albany High School in entered the employ of the Edison Electric Light Company of that city. In 92 he resigned to accept the position of treasurer of the North River Electric Light & Power Company in New York and in the following year was made general manager of the company, but later resigned to take up e practice of law. For a number of ars he practiced as attorney in trial term of the Third Avenue Railway System, but in 1913 the needs of the company in the operating department led to his appointment as assistant general manager. On the retirement of his father as general manager of the system in 1917, Mr. Maher, Jr., succeeded to that position. Through its control of the Union Railway and Yonkers Railroad the Third Avenue Railway operates a large part of the surface electric lines in Bronx Borough and Westchester County besides its extensive system on Manhattan Island.

Mr. Maher was married in 1897 to Miss Frances E. Gilroy, daughter of Thomas F. Gilroy, a former Mayor of New York City.

## Sir Albert Stanley Here

Sir Albert Stanley arrived in the United States on June 7, on the *Mauretania*. Sir Albert, who has just been appointed chairman of the London underground undertakings in succession of Lord George Hamilton, outlined a plan for the improved transit of Londoners by subway and omnibus before he sailed from London. According to Sir Albert, the companies, of which he formerly was managing director, are in process of carrying out the following program:

To acquire as quickly as possible a large number of additional railway cars.

To reconstruct the City & South London Railway so as to provide a new route north and south through the city.

To redesign the cars on the tube railways to make loading and unloading more rapid and convenient and to construct and place on the streets a new and improved type of omnibus.

These improvements will cost several million pounds sterling.

Early in 1917 Sir Albert was made president of the Board of Trade in the British Cabinet, one of the most important official posts in the Kingdom, but some time ago he relinquished these duties at his doctor's suggestion. The *Board of Trade Journal* recently stated that there was every hope and expectation that Sir Albert would shortly be fully restored to health and be able to resume his duties as president of the Board of Trade, but it was reported that Sir Albert desired to retire from the House of Commons at the end of the present session.

It is understood that while Sir Albert has come primarly to America in order to recruit his health he will take advantage of his sojourn to transact a considerable amount of business with the Administration at Washington in connection with the interests of the great department of the British Government of which he has been the chief.

## Mr. Katte President

### Chief Engineer of Electric Traction of New York Central Heads New York Electrical Society

E. B. Katte, chief engineer of electric traction of the New York Central Railroad, has been elected president of the **New York Electrical Society.** As chief engineer of electric traction, Mr. Katte has for many years been in direct charge of all the railroad's electric traction work. He was previously, in December, 1902, appointed electrical engineer and secretary of the electric traction commission of the New York Central Railroad, and in this capacity under direction of the commission he had immediate charge of the electrical and mechanical engineering corps engaged upon the work of electrification of the various lines of the New York Central in New York City and vicinity, this undertaking including the construction of two 20,000-kw. central power stations, nine substations, batteries and electric locomotives, car equipment and the third-rail and transmission system.

E. B. KATTE

Mr. Katte was born in St. Louis, Mo., on Oct. 16, 1871, and is the son of the late Col. Walter Katte, a distinguished civil engineer. He entered the Cutler School in New York City in 1881 and eight years later passed the entrance examination for Sibley College, Cornell University. There he took the regulation four-year course in mechanical and electrical engineering, and upon the acceptance of his thesis, which consisted of a commercial test of one of the first interurban electric railroads, he was graduated in June, 1893, with the degree of Mechanical Engineer. He then traveled through Switzerland and Germany, studying electro-hydraulic plants. Returning to Cornell he took up special work in the design of vertical marine type engines and in mechanical and electrical testing. Upon the completion of this course, in 1894, he received the post-graduate degree of Master of Mechanical Engineering.

After a short term of service with H.

R. Worthington, Mr. Katte became assistant engineer in charge of the direction of the superstructure of the Park Avenue viaduct of the New York Central & Hudson River Railroad in New York City.

In 1898 Mr. Katte was appointed mechanical engineer in the engineering department of the company. In addition to much general work for the company his duties as mechanical engineer embraced the design and installation of mechanical and electrical appliances for numerous coaling stations, water supply stations, electric light and power plants for small passenger and freight stations, offices, yards, shops, transfer tables, cranes, drawbridges, etc. His appointment as chief engineer of electric traction dated from November, 1906. In that capacity he has had charge of the design, construction and operation of the electric traction installation of the company in and about the city of New York.

Mr. Katte was vice-president of the Society of Mechanical Engineers in 1913-1914; he is a Fellow of the American Institute of Electrical Engineers and served on the railroad committee of that body; a member of the American Electric Railway Association, serving on the heavy traction committee, committee on standards and the committee on electrolysis; a member of the American Railway Engineering Association, serving as chairman of the committee on electricity; a member of the New York Railroad Club, serving as chairman of the electrical committee of that association; a member of the American Railway Association, serving on its committee on electrical working, and a member of the American Railway Guild.

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## New Public Service Commissioners in Indiana

Fred Baes Johnson and Glen Van Auken have been appointed by Governor Goodrich as members of the Public Service Commission of Indiana to succeed Edwin Corr and Charles A. Edwards, whose four-year terms expired on May 1, 1919. Both Mr. Johnson and Mr. Van Auken are attorneys and served as officers in the late world war.

Mr. Van Auken was State Senator from Allen and DeKalb Counties in the 1917 and 1919 sessions of the Indiana Legislature, and a short time ago was appointed a member of the State Industrial Board, from which he resigned upon his appointment as Public Service Commissioner.

Mr. Johnson has had a varied career as school teacher, newspaper man, professor of journalism and as an attorney at law.

Both of the new members of the commission are Democrats, but were appointed by the republican state administration under the terms of the act creating the commission which provides that both political parties shall be represented on the board.

## Britishers Coming to United States

At the meeting of the City Council of Liverpool, England, on April 2, it was decided that a deputation of members of the Council be appointed to visit American and Canadian cities to study tramways and electric supply, equipment and improvements. At a meeting of the tramways and electric lighting committee, held on April 4, it was decided that the deputation should consist of the following: Alderman Russell Taylor, chairman of the committee; F. C. Wilson, chairman of the subextension electrical committee; W. A. Robinson, leader of the labor party in the Council, and David Jackson.

The deputation will be accompanied by J. A. Brodie, city engineer; Harold Dickinson, city electrical engineer; C. W. Mallins, tramways manager, and A. G. Smith, city lighting engineer, with the committee clerk.

Several members of the committee expressed their intention of accompanying the deputation at their own expense.

It was announced that the deputation would leave for America on May 27.

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**William H. Murray**, formerly connected with the traffic department of the Santa Fe Railroad at San Francisco, has been made traffic manager and auditor of the Modesto & Empire Traction Company, operating between Modesto and Empire, Cal., and connecting with the Santa Fe system.

**Leslie R. Coffin**, manager at Bellingham, Wash., for several years for Stone & Webster who was called by the company to help at the Hog Island shipyard, Philadelphia, more than a year ago, will be located in San Francisco, where he will cover the Coast states in the interest of construction work for Stone & Webster.

**John W. Raisch** has been appointed a member of the State Board of Railway Commissioners by Governor Norbeck of North Dakota, to fill the vacancy caused by the resignation of P. W. Daugherty. Mr. Raisch is a native of North Dakota, a graduate of the State university, general course as well as the law department, and has been a newspaper man and practicing lawyer in the State for a number of years.

**Richard W Meade** formerly president of the Fifth Avenue Coach Company, New York, has been elected president of the Detroit Motorbus Company, organized to put a line of motor buses on several streets in Detroit. An initial service with 100 double-deck buses is proposed and the fare is to be 10 cents. Before becoming an officer of the Fifth Avenue Coach Company, Mr. Meade was connected with the Metropolitan Street Railway, New York, N. Y., under President Herbert H. Vreeland.

**Edmond S. Gillette**, mechanical and electrical engineer of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., for the past six years, has resigned to become associated with the Lyon-Metallic Company at Montgomery as service engineer. Mr. Gillette served as a member of the power distribution committee of the American Electric Railway Association and chairman of the electrical engineering committee of the Illinois Electric Railways Association. He is a member of the Master Car Builders' Association.

**Fred A. Cummings**, formerly reporter for the Lynn (Mass.) *Item* and lately special writer on the Boston *Globe*, has selected by the trustees of the Bay State Street Railway, Boston, Mass., to be public relations representative of that system under the public trustees. The duties of this office will be to encourage the most amicable relations between the management and the patrons. All complaints will be investigated, all suggestions heeded and the utmost endeavor will be used by Mr. Cummings to have the railroad serve the best interests of the people who pay the fares, and the people co-operate with the trustees.

**Clyde Taylor** has resigned as vice-president, director and general counselor of the Kansas City (Mo.) Railways to resume the practice of law. Prior to 1912, Mr. Taylor was engaged in corporation work and was called by the receivers of the Metropolitan Street Railway, as assistant counsellor, handling practically all of the legal phases of the valuation work, and assisting in the preparation of the franchise. He became general counsel for the company in 1916, and during the absence of Col. Philip J. Kealy, acted as president of the company. Under Mr. Taylor, new problems confronting the company were successfully worked out. These included the 6-cent fare and Kansas bridge matters. Upon his retirement, the board of directors of the Kansas City Railways adopted a resolution praising him for his work, saying that "any lawyer should be proud of the record made."

**Daniel L. Ryan**, recently secretary to Borough President Frank L. Dowling, has been appointed by Transit Construction Commissioner John H. Delaney as deputy transit construction commissioner. In the law separating the functions of the public service commissioner and the transit construction commissioner, provision was made that the latter should have one deputy, at a salary of $7,500. Mr Ryan is a former newspaper man with wide experience in municipal affairs and has been familiar with rapid transit matters for many years. He is particularly well fitted for his new post as deputy in the work of transit construction. In that he has made a special study of the dual system contracts and followed every stage of their preparation previous to their execution in 1913. Mr Ryan served as secretary to the New York State Commission to the Panama-Pacific Exposition. He is vice-president of the Taxpayers Alliance of the borough of the Bronx.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Fibre Conduit Market Opening Up

### Power House and Line Developments Are Light at Present—Prices All Off Slightly

The market for fibre conduit, in its relation to electric railway work, presents only a fair condition. In the fields where it is generally used for that work—power house building and additions, underground feeder line extensions and ducts for communication and signal wires—there has been little business offered in the past two years, but of late the market has begun to open up.

This resumption of trade is more noticeable in the larger cities of the middle west where recent orders placed show returning activity. The foreign field is also buying fibre conduit, according to recent shipments to Europe, and more orders would be booked to South American countries were the oat bottoms available. However, the xport trade is liable to suffer because f the excessive freight charges. Where freight is charged on volume rather han weight this product is greatly andicapped, for these charges have een twice the value of the product.

There has been found a recent easing ff in price of about 8 per cent, but this as not been traced to any easier costs f labor or materials. Factory stocks f raw materials are satisfactory and eliveries of the conduit can be made ractically immediately. It is expected hat by next year the fibre conduit usiness will be in excellent shape.

## Rails Bonds and Wire Higher

### iscounts on Former Drop 2½ Points—Copper at 17⅝ Cents

Rail bond discounts have dropped om 25 to 22½ per cent making a high- net price on bonds of 3½ per cent. hile not very great, the advance ows quite clearly the tendency of nds to follow the price of copper up- ard. It developed upon inquiry among anufacturers' representatives that ere has been no marked improvement the demand for bonds. Shipment, is learned, can be made immediately.

Copper quotation now stands at 162½ cents, which is 1¼ cents above quotation of two weeks ago. Cop- wire base net prices at the mill recorded at 19½ to 20 cents. Bare e manufacturers' bases in the last weeks have advanced about 1 cent are quoted at 19½ and 20 cents. atherproof wire bases have increased 1 to 2 cents and vary from 20 to 22 cents. Rubber-covered wire base has changed only in the respect that one or two manufacturers have increased a cent or two, but the predominating base holds at 21 cents.

## Brooklyn Buys Two Hundred Safety Cars

### Cars to Be Furnished Complete by Manufacturer Except for Fare Boxes and Registers

An order for 200 safety cars was placed with the J. G. Brill Company, Philadelphia, by the Brooklyn Rapid Transit Company this week. As described in the ELECTRIC RAILWAY JOURNAL of March 1 of this year, trial operation with safety cars was begun in Brooklyn on Feb. 23. Altogether, twelve cars were placed in this test service. Six of these were furnished by the American Car & Equipment Company of St. Louis, Mo., and six by the J. G. Brill Company. As a result of this trial the Public Service Commission for the First District, New York, granted permission for the purchase of 200 safety cars as described in this paper for May 3.

### SPECIFICATIONS REQUIRE FULL EQUIPMENT

After this permission was granted the company sent out inquiries with complete specifications for the cars and equipment to be furnished. With the tenders submitted by the various manufacturers, drawings were required so that the railway company's engineers could form a definite idea as to the car construction and equipment to be furnished. The cars now ordered are to be furnished complete by the manufacturer with all equipment except fare registers and fare boxes which will be furnished by the railway company. The fare registers will be of the company's standard electrically operated type and for this equipment registers now on hand will be used.

The details of construction and equipment have not been definitely decided on as yet other than they will be required to meet the railway company's specifications. These require a practically standard safety car with a few modifications which have appeared advisable as a result of the test operation. The truck construction will be modified somewhat so as to provide not only for a different journal box arrangement but also for easier removal of the journal boxes. The truck frame will be spring suspended. Standard type of friction bearings will be furnished throughout.

## Increasing Demand for Veneers for Repairs

### May Replace Shaped Iron Boxes and Covers—Warping Difficulties Overcome

Traction companies are using more and more for repair work veneer products which can be readily moulded to take any simple curve. This class of material is also coming more into use in new cars. Former difficulties in the manufacture of the cement used in this product have been overcome so that now the material is impervious to heat and moisture.

It is particularly adaptable for use as headlining, for seats and for outside panels both on the front and along the sides of the car, where changes in temperature and mositure conditions would produce warping.

The lightness and strength of the material is appealing to one prominent manufacturer of electric railway equipment to the extent that he is experimenting with it to replace iron boxes and covers. The cost of it also is a feature in this respect as it is less than that of cast iron for these covers. The wood may be impregnated to be made fire resisting or lined with asbestos when used in the proximity of arc-breaking contacts.

One manufacturer of this material was working up to capacity on war work, but is now down to about one-third capacity since the cancellation of war contracts. He is just getting back to commercial business and reports daily orders from traction companies for materials for car repairs. Deliveries are practically immediate.

## Steel Pole Market in Better Shape

### Orders Are Coming in in Increasing Volume and No Evidences of Price Changes Seen

A better market for steel poles has arisen, probably because buyers have come to the conclusion that no additional reduction in steel prices is in sight. The last reduction in steel took effect on April 21, and tubular and open-work steel poles were reduced at that time. Prices of poles have been holding steady since then, and the steel market has experienced little change. There has been considerable business done in steel, however, so it hardly seems necessary to reduce prices to stimulate business any further. Besides, there is no evidence that of their own accord steel prices will undergo much reduction for some time to come.

Still there is found no intention of guaranteeing pole prices with the present unsettled steel market.

With the utilities it seems to be a lack of buying power rather than a belief that prices are too high, that keeps them out of the equipment market. Production has been so curtailed that lower prices due to quantity production cannot be reached. However, some utilities have gone ahead with their plans and pole orders have increased. Besides, the number of inquiries has greatly increased and only a short time is anticipated before many of these will be turned into orders. Much of this is for the domestic market, but there is also considerable activity contemplated in Canada, the Southern Republics, Europe and even Africa.

## Illinois Steel Company Reorganization

The Illinois Steel Company has announced a reorganization of its general sales department, effective June 1, 1919, pursuant to which there have been created three divisions of the department, the structural and plate division, the bar division, and the rail, billet and pig-iron division; each division to be in charge of an assistant general manager of sales, who will report to the general manager of sales. The following appointments have been made to fill the new positions created: J. B. Arnold, assistant general manager of sales, in charge of the structural and plate division. B. E. Hamilton, assistant general manager of sales, in charge of the bar division. P. W. O'Brien, assistant general manager of sales, in charge of the rail, billet and pig-iron division.

A new department has been formed to be known as the Chicago district sales office, through which will be cleared sales originating in the territory comprising the northern half of Indiana and Illinois, Iowa, Nebraska, southern Wisconsin and the southern end of the Michigan peninsula. J. G. Carruthers, manager of sales of the Illinois Steel Company at Cincinnati, Ohio, has been transferred to the Chicago office and appointed manager of the Chicago district sales office. All of the new appointees have been connected with the Illinois Steel Company for a number of years, and, with the exception of Mr. Carruthers, have been located in the general sales offices in Chicago.

## Oil Market Quiet

The market for oils for lubricating and other electric railway purposes has undergone little change this year. Prices are steady with no apparent indication of a rise. In order to protect the traction companies in case of a drop, it is quite general to insert a clause in the contracts to allow them the advantage of this.

There has been found no evidence that railways are seeking different terms in their contracts because of post-war conditions.

## Rolling Stock

**Quebec Railway, Light & Power Company** has asked for prices for the supply of ten double-truck pay-as-you-enter type of cars, 41 ft. long, for its city service.

**Quincy (Ill.) Railway** is expecting delivery of twenty-five new cars. A second snow sweeper, an electric welder, a trolley guard and other equipment will, according to reports, come with the new cars.

**Hydro-Electric Power Commission of Ontario, Canada,** has ordered an additional 50-ton electric locomotive similar to the six ordered previously. This will also come from Canadian Car and Foundry Company.

**Capital Traction Company, Washington, D. C.,** announces the placing of an order for twenty additional cars. The contract was given J. G. Brill Company of Philadelphia and delivery will be made in the fall. The cost of this new equipment will be in the neighborhood of $250,000.

**Washington Railway & Electric Company, Washington, D. C.,** plans placing fifteen new cars in service by fall, according to president William F. Ham. The additional rolling stock will be paid for out of insurance received from the destruction by fire of the Eckington barn. There will be available about $100,000 for the purchase of new car bodies, which will be equipped with repaired motors and trucks salvaged from the fire. This is the only additional equipment the Washington Railway & Electric Company proposes to acquire at this time, as the relief given through the 2-cent transfer charge, it is stated, will not be sufficient to enable it to finance further purchases of rolling stock.

## Recent Incorporations

**Sikeston & Southeastern Railway, Sikeston, Mo.**—Incorporated to construct a line from Sikeston, Mo., to Hickman, Ky., via East Prairie, 30 miles. The construction of the line includes twelve wooden bridges from 20 ft. to 50 ft. long. The company would like to receive prices on second-hand rails. Incorporators: M. G. Gresham, Citizens' Bank Building, Sikeston, Mo.; T. A. Wilson, E. A. Matthews, L. M. Stallcup and others.

## Franchises

**Montgomery, Ala.**—The Montgomery Light & Traction Company has received a franchise from the City Council to construct an extension on Bell Street to the city limits.

**Newport, Ky.**—The Andrews Steel Company has asked the City Commissioners of Newport for a franchise to construct an electric railway on Licking Pike from Eleventh and Brighton Streets to Twelfth Street, west to Lowell and south to the corporation line. The line is to be known as the Licking Valley Railway.

## Track and Roadway

**Calgary (Alta.) Municipal Railway.**—The City Council of Calgary contemplates electric railway extensions estimated to cost in the neighborhood of $50,000.

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—It is reported that an extension will be built by the San Francisco-Oakland Terminal Railways of its Twenty-third Street line in Richmond. It is stated that the company intends to build through to Giant and Hercules this year and to Martinez ultimately.

**Pasadena, Cal.**—The City Commission of Pasadena will begin at once a preliminary survey of a right-of-way for the construction of a municipal railway to connect Pasadena and Los Angeles. The survey will be made by the engineering department of the city under direction of R. V. Orbison, city engineer.

**Iowa Southern Utilities Company, Centerville, Iowa.**—The Iowa Southern Utilities Company will ballast 7 miles of interurban track.

**New Orleans, La.**—A committee representing the cities and towns between New Orleans, La., and Mobile, Ala., inclusive, met recently at Biloxi and awarded a contract to James W. Billingsley, New Orleans, for a preliminary survey for the proposed municipally-owned line between those two cities and along the Gulf Coast. [April 5, '19.]

**Fenton, Mich.**—W. E. Martin, Flint, is interested in the construction of an electric railway between Flint and Owosso.

**Public Service Railway, Newark, N. J.**—New track is being laid by the Public Service Railway on Elizabeth Avenue, Elizabeth, N. J., for a distance of about 1 mile.

**New Jersey & Pennsylvania Traction Corporation, Trenton, N. J.**—The city Commission of Trenton has granted permission to the New Jersey & Pennsylvania Traction Company for double-tracking its line on Calhoun Street as far as the Delaware River.

**Long Island Railroad, New York, N. Y.**—Plans are being considered by the Long Island Railroad for the complete electrification of its Montauk division to extend to Babylon. The line is electrified at present as far as Lynnbrook, the remaining distance to Babylon being about 19 miles.

**Capitol Car Line, Bismarck, N. D.**—An extension will be built by the Capitol Car Line to connect with the Soo Line and thence to the capitol, forming a loop.

**Cincinnati (Ohio) Traction Company.**—At a recent conference between city ficials of Cincinnati and Walter raper, vice-president of the Cincinnati raction company, a large number of nprovements of car tracks of the Cinnnati Traction Company were agreed oon. Chief among these are the ouble-tracking of Central Avenue om Liberty to Mohawk Bridge, layg of new tracks on Harrison Avenue nd the probable elimination of the ohawk bridge over the canal.

**Cobourg, Ont.**—It is reported that e construction of an electric railway om Central Ontario Junction in Rawon township, through Campbellford nd Seymour, Percy, Haldimand and amilton townships to Cobourg is nder consideration. J. A. Humphries, ampbellford, is interested.

**Toronto, Ont.**—The Ontario Hydrolectric Commission of Canada has een asked by boards of trade in towns ong the north shore of Lake Erie etween Bridgeburg and Port Colburne, Ont., to start immediate conruction of the hydro-radial line beveen these two points, a distance of bout 30 miles. Before the outbreak of ar the towns along the proposed route oted to guarantee the bonds incident the construction but the war stopped ork on the proposed line. The towns ow contend that there should be no elay in starting the line because it is onsidered an urgent necessity and ould give work to returning Canadian ldiers.

**Toronto & Eastern Radial Railway, oronto, Ont.**—It is reported that the oronto & Eastern Radial Railway will completed in the near future. Track s been laid from the eastern limits Bowmanville to the western limits Whitby, a distance of 15 miles. rom Whitby to Pickering the roadway ready for track laying. W. E. Oliver, perintendent of electric lines. [May , '15.]

**Toronto (Ont.) Street Railway.**—It reported that the Toronto Street ailway contemplates the reconstruction of 6.324 miles of track.

**Reading Transit & Light Company, eading Pa.**—The City Council of eading, Pa., has passed an ordinance nending existing legislation to the tent of permitting the Reading Trant & Light Company to use T-rail here tracks are being renewed on reets that are being re-paved by the ty. Substitution of T-rail in place of rder rail heretofore specified will enle the transit company to do a larger nount of new track work with the oney that is available for the purpose is year.

**Levis (Que.) County Railway.**—A port from the Levis County Railway ates that it is rebuilding the remaing portion of 12 miles of single track t completed last year.

**Montreal, Que.**—The harbor commisoners of Montreal have decided to oceed with the electrification of the rbor railway tracks, held up by the ar, and plans are now being prepared. is year the electrification will be pushed as far as possible; in fact it is expected that that part of the system between Victoria pier and Montreal east will be in operation by September.

**Dallas, Tex.**—Surveys have been begun by the Fred A. Jones Construction Company of Dallas for the proposed interurban line from Dallas to Wichita Falls, 125 miles. Several tentative routes will be surveyed and estimates of cost made for each. Wiley Blair, Dallas, is chairman of the committee of citizens that is promoting this line. The estimated cost of the line is about $6,000,000. [Mar. 22, '19.]

**Dallas (Tex.) Railway.**—The Dallas Railway, in requisitions filed and approved by Lynn B. Milam, supervisor of public utilities, has asked permission to spend $650,000 for the purpose of improving the company's present lines and building extensions. Supervisor Milan says a total of $525,000 will be spent immediately on the improvements of tracks on Elm Street, McKinney Avenue, and Main Street and for passing curves and the installation of new equipment. The improvements will also include tracks on Preston Street. The extension of car lines, which includes the Seventh Street line in Oak Cliff, the line to Oak Lawn and to the City Hospital and one to Oakland Cemetery, will be held up pending the laying of storm sewers and the opening of necessary streets by the city. An extension to Mount Auburn district, though not officially announced, is contemplated and will be ordered built by the supervisor if the extensions as proposed are delayed.

**Dallas (Tex.) Southwestern Traction Company**—A. P. Turner, president of the Dallas Southwestern Traction Company, which proposes to build and operate an interurban line from Dallas to Irving, a distance of about fifteen miles, and thence southwestward through Grand Prairie, Mansfield, Cleburne to Glen Rose, announces that construction work is expected to begin at once on the Dallas-Irving line. About one-half of the grading has been done and ties and rails have been purchased for a large part of the line. [May 4, '18.]

**El Paso (Tex.) Traction Company.**—An extension will be built by the El Paso Traction Company to serve the El Paso High School.

**Wichita Falls, Tex.**—The Chamber of Commerce of Wichita Falls has under consideration the proposition of the construction of an interurban railway between Wichita Falls and Burkburnett. The matter was presented to the board of directors by W. L. Sonntag, a railroad contractor of Evansville, Ind. The line would obtain its power from the Texas Light & Power Company.

**Seattle (Wash.) Municipal Railway.**—Extensions, additions and betterments of the Seattle Municipal Railway system were authorized by the City Council recently by the passage of an ordinance enumerating in detail the improvements contemplated and authorizing an issue of utility bonds to the amount of $790,000 to finance the construction program specified.

**Ohio Valley Electric Railway, Huntington, W. Va.**—It is reported that the Ohio Valley Electric Railway contemplates the construction of a line on Eleventh Avenue from Eighth Street to West Fifth Street.

## Power Houses, Shops and Buildings

**Iowa Southern Utilities Company, Centerville, Iowa.**—The Iowa Southern Utilties Company will reconstruct its power house at Centerville.

**Rockford & Interurban Railway, Rockford, Ill.**—The Rockford & Interurban Railway contemplates the erection of a new power plant at Belvidere.

**Bangor Railway & Electric Company, Bangor, Me.**—Improvemnts are contemplated by the Bangor Railway & Electric Company at both the Ellsworth and Veazie power stations; also the reconstruction and reinsulation of the feed wires between the two stations. At the Ellsworth station a 25,000-kw. generating unit will be installed and at the Veazie station three high-efficiency waterwheels will replace the old wheels now in use.

**New England Power Company, Worcester, Mass.**—The New England Power Company, which furnishes energy to the Berkshire Street Railway, plans extensions and improvements to its power plant and distributing systems, involving an expenditure of about $1,000,000 this year. The proposed work will include enlarging the power station at Vernon, Vt., and the installation of water wheels and generators, increasing the generating capacity by 15,000 hp, the erection of additional substations, and also connecting the present system, which covers central and western Massachusetts and a large portion of Connecticut and Rhode Island, with the Metropolitan Board of Boston by erecting a feed line into and from the stations of the Edison Electric Illuminating Company of Boston.

**Public Service Corporation, Newark, N. J.**—Work will soon be begun by the Public Service Corporation on the erection of an electric transmission line to extend from Bordentown to the Municipal Water Works.

**New York Municipal Railway Corporation, Brooklyn, N. Y.**—Plans have been prepared by the New York Municipal Railway Corporation for the erection of two new one-story structures at 420-22 Broadway.

**Ohio Electric Railway, Lima, Ohio.**—The Ohio Electric Railway contemplates improvements to its local plant, involving an expenditure of about $200.000. The company also plans to build within the next five years, either at Indian Lake or Scotts Crossing, a power plant to cost about $2,000,000.

**Lawton Railway & Lighting Company, Lawton, Okla.**—After July 1, the Lawton Railway & Lighting Company will abandon its power plant and secure all its power from the Comanche Light & Power Company. The Comanche company will install additional equipment to take care of the increased business, including a synchronous motor generator with 250 kw. capacity.

**Altoona & Logan Valley Electric Railway, Altoona, Pa.**—The construction of an addition to its power plant at Tyrone, to cost about $500,000, is being considered by the Altoona & Logan Valley Electric Railway.

**Waynesboro (Pa.) Electric Company.**—Preliminary work has been begun by the Waynesboro Electric Company, which is controlled by the Chambersburg, Greencastle & Waynesboro Street Railway, for the construction of a new high-tension power system from the present terminus at Blue Ridge Summit to Greenstone, about 2 miles.

**Sneedville, Tenn.**—John N. Adams, Chemical Engineer, Charleston, Tenn., will construct a hydro-electric plant on the Clinch River at the Auger in Hancock County, to furnish energy for the operation of an electric railway. The transmission system will extend from Morristown to Moorsburg, Treadway, Sneedville and Kyle Ford. The plant will develop 4,000 hp.

**Texas Electric Company, Dallas, Tex.**—Construction will be begun immediately on a six-story addition to the east end of the Dallas Interurban Building, to make the entire structure of an even height of eight stories. The addition will cost approximately $150,000. Plans have been prepared and are now ready for contractors' estimates.

## Trade Notes

**Ford Mica Company, Inc.**, is now at 14 Christopher Street, New York City.

**Inquiry 29,478.**—A Brazilian engineer, who will be in the United States shortly, desires to purchase materials for the construction of an electric railway, and for electric railroad supplies. Consult Bureau of Foreign and Domestic Commerce, Washington, D. C., using number.

**Electric Locomotive Exports.**—Exports of electric locomotives for March 1918, were $17,000 while for March 1919, they more than doubled, to $35,687. For the nine months through March 1918, these exports amounted to $122,679, and these nearly doubled to $223,452 for the same length of time through March, 1919.

**Bailey Meter Company, Cleveland, Ohio,** announces the removal of main office and works to East Forty-sixth Street at Euclid Avenue, Cleveland, Ohio. The Boston office will be maintained to render engineering and sales service in New England and Atlantic Coast States under the management of H. D. Fisher.

**Walter Treat Walker** has been appointed manager of the Buffalo office of the Western Electric Company. During the war he served as first lieutenant in the Signal Corps, U. S. A., and on his discharge from the service he was appointed manager of the Newark office, in February, 1919. Gregory Brown has been appointed manager of the Newark house to succeed Mr. Walker.

**Charles H. Dennis,** formerly operating head of the Railway Audit & Inspection Company, has been elected general manager of the Railway & Industrial Protective Association, Inc., of Maryland. Mr. Dennis will maintain operating offices in Philadelphia. V. L. Edmunds, formerly general manager of the Railway & Industrial Protective Association, has been elected vice-president in charge of operating.

**J. W. McCabe,** who until recently has been district manager of sales for the Chicago Pneumatic Tool Company, at Buffalo, N. Y., has been appointed special representative for the company's foreign trade department, and will depart shortly for an extended trip throughout the Orient, the Philippine Islands and Australia. W. H. White has been appointed acting district manager of sales at Buffalo to take charge of that territory during Mr. McCabe's absence.

**John E. Muhlfeld** has associated with him several other engineers and has formed the Railway and Industrial Engineers, Inc., with offices at 25 Broad Street, New York City, to act as consulting and advisory engineers among the bankers, railroad and industrial corporations. For the last three and one-half years he has been president of the Pulverized Fuel Equipment Corporation, but he has resigned as president of this corporation to devote his entire time to engineering work. Mr. Muhlfeld retains his interests in and remains a director of the Pulverized Fuel Equipment Corporation.

**Charles Gilman,** at a recent meeting of the board of directors was elected to a vice-presidency of the Massey Concrete Products Corporation, to have headquarters in New York. Mr. Gilman will be in charge of sales in the Eastern territory of the corporation, comprising New York, Pitsburgh, Southern and Canadian Districts. Part of his early concrete work was on the New York subways in 1904 and 1905. In 1911 he became identified with the concrete products business as assistant to Mr. Quincy, then the vice-president of the American Concrete Pile & Pipe Company. When this organization was taken over by the C. F. Massey Company in 1912 he became Eastern engineer and in 1913 he became Eastern manager.

**E. A. Hitchcock** has recently become connected with the Bailey Meter Company of Cleveland, Ohio, as vice-president. He will supervise the training of technical graduates for the company's service and sales departments. During the past six years he has been connected with the E. W. Clark & Company Management Corporation as advisory, consulting and power sales engineer. Previous to that time he was Professor of Experimental Engineering at Ohio State University.

**William Arthur,** of the Arthur Power-Saving Recorder Company, New Haven, Conn., addressed the Springfield (Mass.) Rotary Club on May 29 upon the economical use of energy in electric railway operation. The Springfield Street Railway is equipping its cars with the Arthur recorder, and in the course of his remarks Mr. Arthur stated that during the past year the use of this equipment saved 34.01 per cent of the power required at Meriden, Conn., 25.09 per cent at Hartford, Conn., 22.4 per cent at Bridgeport, Conn., and 18.56 per cent at New Haven, despite a traffic increase of 9.17 per cent in the last-named city. Mr. Arthur pointed out that careless operation may cause a needless loss of 100 tons of coal per motorman per year and maintained that by utilizing coasting possibilities to the utmost, a saving of 25 to 30 per cent in power requirements per year can be made without falling behind the schedule of car operation.

## New Advertising Literature

**Jeffrey Manufacturing Company, Columbus, Ohio:** A eleven-page catalog, No. 244, describing standard bucket elevators.

**C. H. Wheeler Manufacturing Company, Philadelphia, Pa.:** An illustrated booklet of 191 pages to describe its condensers and auxiliaries.

**Union Switch & Signal Company, Swissvale, Pa.:** Bulletin No. 92, in which Vane Type Alternating Current Relays are described.

**Hickey & Schneider, Inc., 441 East Jersey Street, Elizabeth, N. J.:** Bulletin No. 13, of forty-eight pages, which covers H. & S. outdoor-type bus supports.

**Carbolineum Wood Preserving Company, 518 Prairie Street, Milwaukee, Wis.:** Circulars No. 29 and 39, telling about the "Arrow" carbolineum wood preservative.

**Hilo Varnish Corporation, Marcy and Flushing Avenue, Brooklyn, N. Y.:** Third revised edition of bulletin No. 1 on "Hilo" black enamels and varnishes for air drying and baking.

**Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth Street, New York City:** Bulletin No. 48713 on the Sprague adjustable-loop system of overhead material handling machinery for terminal sheds.

**H. B. Ives Company, New Haven, Conn.** A pamphlet descriptive of trolley wheels and bushings. The bushings are self-lubricating, being filled at the factory with a heavy lubricating compound under pressure, so that they can be used throughout their life without lubricating oil.

These 89,000 lb. Cars

are all equipped with

Peacock Brakes

These are the famous rapid transit cars of the New York Municipal Railways. They operate where the demand for safety is paramount.

It is surprising to what a great extent the motormen use the Peacock brakes on these cars —but that just goes to show you their great reliability and handiness. A look at the cost books of the Company would also show you a remarkable absence of Peacock repair costs. Heavy or light weight cars, the motormen and the cost accountants both like the Peacock.

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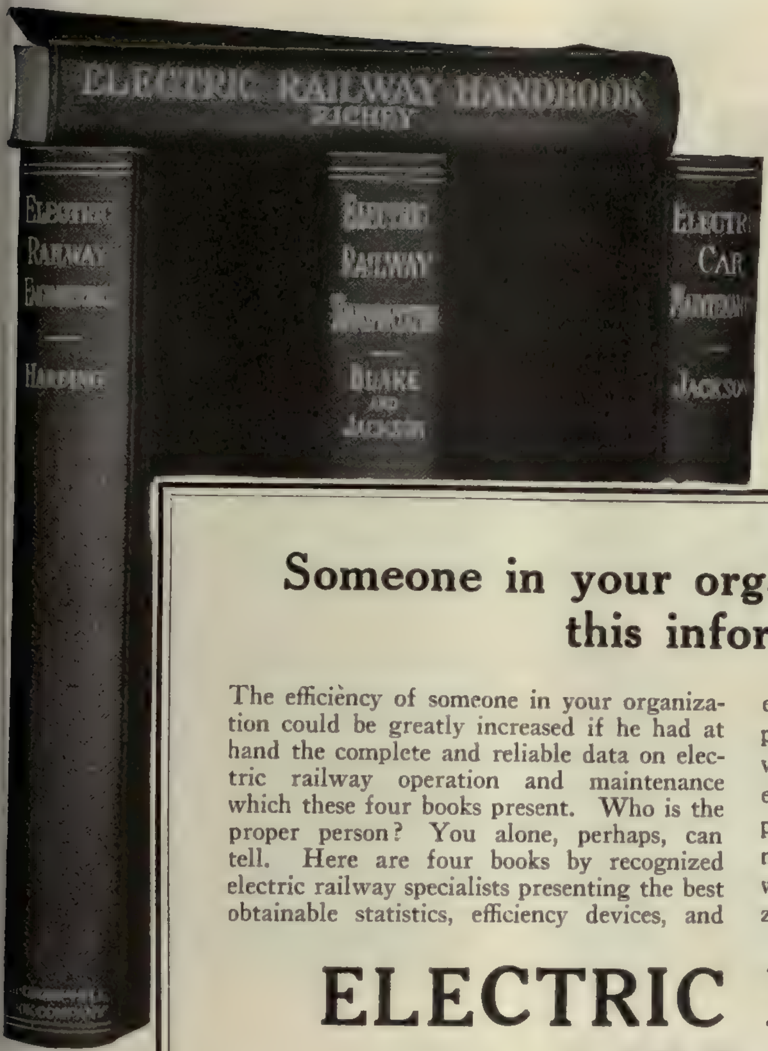
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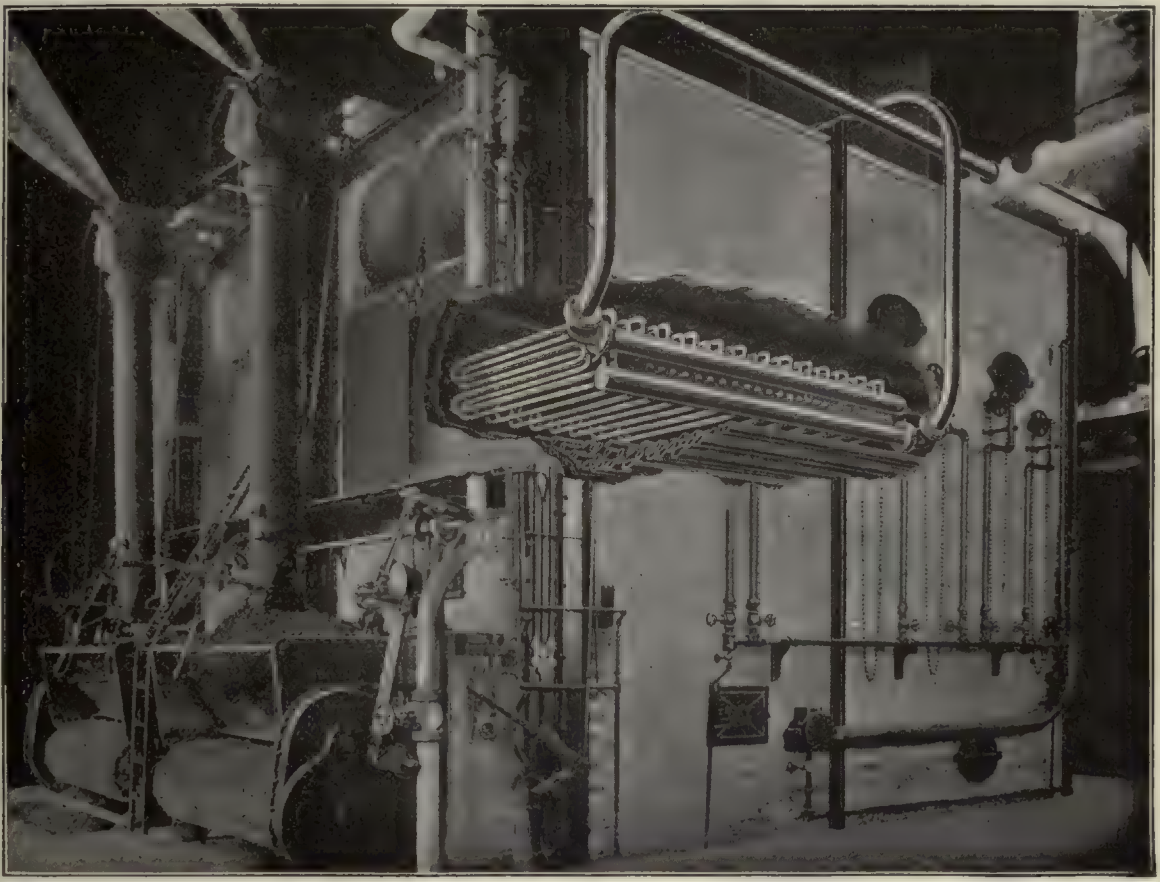

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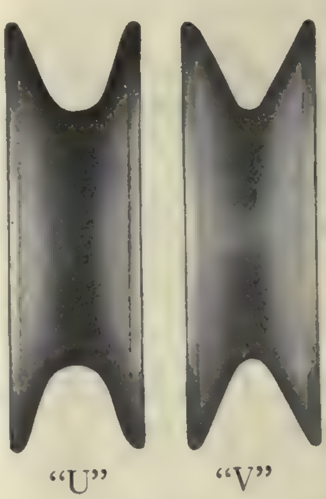

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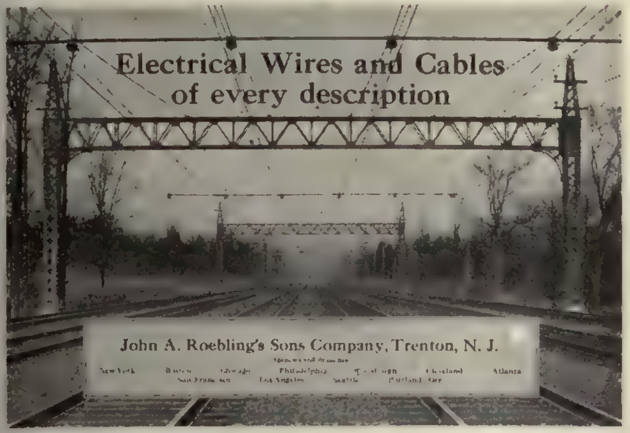

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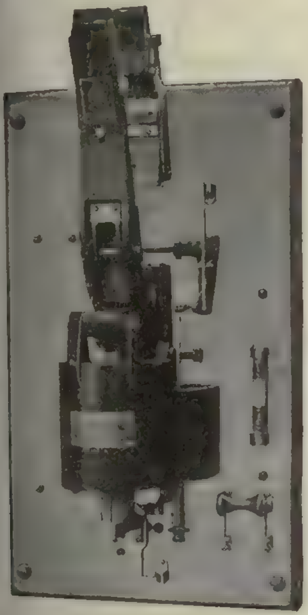

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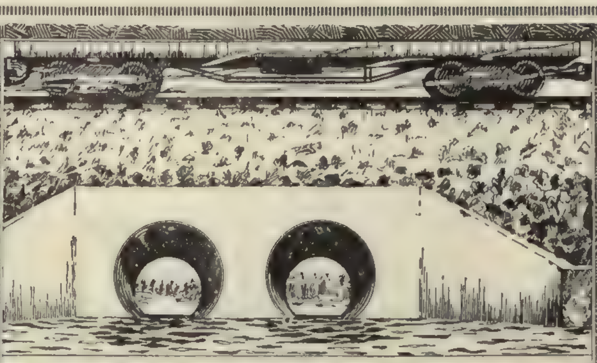

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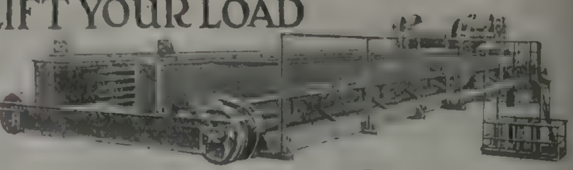

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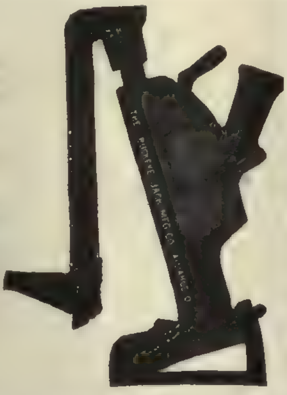
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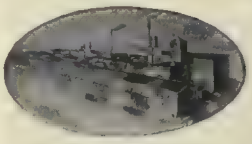

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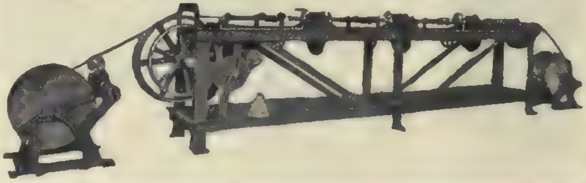

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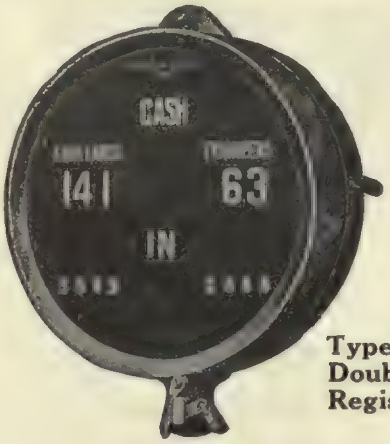
**D & W Oil Fuse Cutouts**
D & W Fuse Co., Providence, R. I.

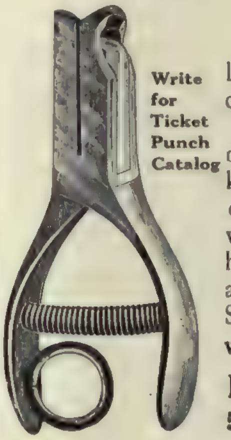


INTERNATIONAL FARE REGISTERS

**Type-R-5 Double Register**

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot operating devices for single and double registers.
Exclusive selling agents for
HEEREN ENAMEL CAP AND COAT BADGES.

**The International Register Company**
**15 South Throop St., Chicago**



It Has Revolutionized the Changer Field!

*The*
**High Speed Lever Operated Conductors' Coin Changer**
(1919 Model)

**Write for Ticket Punch Catalog**

Wonderfully speeds up fare collection and change making for the conductor.

A remarkable improvement over any other changer on the market. Makes change as fast as you can count it. Simply press the lever with thumb of either right of left hand and coins drop naturally, one at a time into the hollowed hand. So simple a child can operate it.

**Write for illustrated circular describing it.**

**McGill Ticket Punch Co.**
**542 W. Harrison St., Chicago**

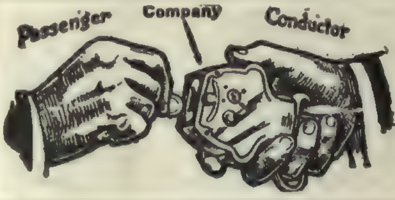
THE
CLEVELAND
Is the practical Fare Box for
Service at Cost
Let us tell you why

**The Cleveland Fare Box Co.**
Cleveland, Ohio
Canadian Branch: Preston, Ont.

**Heating and Ventilating**

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost

**The Cooper Heater Company**
Carlisle, Pa.



**Direct Automatic Registration**
By the
**Passenger**

**Rooke Automatic Register Co.**
Providence, R. I.

**The Economy Railway Meter**
Induces Power Saving.
Our power-saving bulletins will vitally interest you right now. Ask for them.

**Economy Electric Devices Co., Chicago**

PS
HEATERS

**Car Heating and Ventilation**

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. **Write for details.**

**The Peter Smith Heater Company**
**1725 Mt. Elliott Ave., Detroit, Mich.**

**75% of the electric railways**
use
**B-V Punches**
*Send for Catalog.*
**BONNEY-VEHSLAGE TOOL CO., Newark, N.J.**

**A Single Segment or a Complete Commutator**

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

**Cameron Electrical Mfg. Co., Ansonia, Connecticut**

WE CAN CUT YOUR COST OF

## HEATING CURRENT

Write for THERMOSTATIC CONTROL INFORMATION

**GOLD**

ELECTRIC HEATERS Cut Installation and Maintenance Charge.

VENTILATORS Also Ventilate in Stormy Weather.

THERMOSTATS Save Current.

ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.

ORIGINATED The Ventilated Coil Support.

LET US FIGURE ON YOUR NEXT REQUIREMENTS

**Gold Car Heating & Lighting Co., 17 Battery Pl., New York**

---

## "It Behooves You to Hooverize Your Motormen"

***We can help you***

Write to

**The Arthur Power-Saving Recorder Co.**
**2nd National Bank Bldg., New Haven, Conn.**

---

## Le Carbone

Carbon Brushes are uniform. They talk for themselves.

**W. J. Jeandron**
**227 Fulton Street**
**New York City**

**Pittsburgh Office:**
**636 Wabash Building**

**Canadian Distributors:**
**Lyman Tube & Supply Co., Ltd.**
**Montreal and Toronto**

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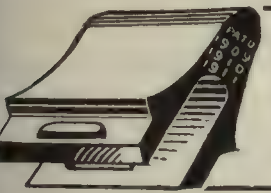

This is the Reversible Tip of the Trigger Lock Reversible Controller Finger after 2 years' wear.

It is made of copper but has twice the life of drop-forged copper used in ordinary fingers. And since it can be reversed for re-use, the economy is still greater. The Trigger Lock Reversible Controller Finger also saves time and labor in replacement.

Trigger Lock Reversible Controller Finger

U. S. Factory: 814-18 Bath Ave., Niagara Falls, N. Y.
Canadian Factory: 557 King St., West, Toronto, Canada.

---

## 32,680 MILES

was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

## U S G Brushes

are especially designed for the service in which they are to operate.

**THE UNITED STATES GRAPHITE COMPANY**
Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Atlanta, Chicago, St. Louis, Denver, San Francisco.

---

"Trade Mark Reg. U. S. Pat. Off."

## Samson Spot Waterproof Trolley Cord

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

1 SAMSON CORDAGE WORKS, BOSTON, MASS.

---

## PYRAMID BRUSHES

—Not only a faithful study of the electric railway industry,

—Not only a completely equipped laboratory to design and direct the manufacture of the product,

—Not only a rigid selection of raw material,

—Not only careful inspection during and after the process of manufacture,

But all these things combined are responsible for the high quality of Pyramid Brushes.

**NATIONAL CARBON COMPANY, INC.**
**Cleveland, Ohio.**

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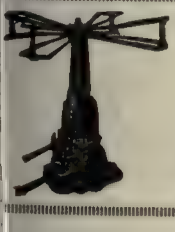


Use them in your terminals—

## PEREY TURNSTILES or PASSIMETERS

*Faster than the ticket seller*

**Perey Manufacturing Co., Inc.**
30 Church Street, New York City

POSITIONS VACANT

# EMPLOYMENT

POSITIONS WANTED

## POSITIONS WANTED

AUDITOR solicits change; 18 years' experience in street railway accounting; age 35; married; references. PW-416, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

MASTER mechanic or general foreman. Age, 37; married; will be open for position after June 15; over 18 years with one company; the last three years as master mechanic. Willing to go anywhere. Best references. PW-422. Elec. Ry. Journal.

MASTER mechanic wants position; have had 15 years' experience in all lines of maintenance and construction; can handle men and get results. A-1 references furnished. PW-430, Elec. Ry. Journal, Philadelphia.

POSITION as claim agent wanted. Have had 20 years' experience as head of department with present company. Reason for desiring change want larger property and broader field. Can give best referenecs and can deliver the goods. Am 40 years of age and married. PW-429, Elec. Ry. Journal, Philadelphia.

SUPERINTENDENT of construction would like to take hold of transmission line or catenary construction; have had 12 years' experience as superintendent on this class of work; at present employed; minimum salary, $3000 and expenses, if a camp job. Address PW-427, Elec. Ry. Journal, Philadelphia.

SUPERINTENDENT wants position; 21 years' experience as dispatcher, chief dispatcher, trainmaster and superintendent of one of the largest interurban railroads in the country; 42 years old; can furnish A-1 references. PW-425, Elec. Ry. Journal, Chicago.

## AGENTS AND SALESMEN

**Do You Want Representation in Manchuria?** Advertisers are invited to communicate with Messrs. Fukusho Company, Dairen, Manchuria, who are interested in all kinds of machine tools, engineering requirements and railway materials. If not already represented in Manchuria, Fukusho Company invite correspondence with this end in view. Advertisers are requested to forward catalogues, prices and terms offered.

WANTED

**1—Air Brake Repairman,**
**1—Air Brake Inspector,**
**1—Controller Repairman,**
**1—Electrical Repairman and Inspector, for day work,**
**1—Electrical Repairman and Inspector, for night work,**

**for an Electric Railway property operating 75 cars in an Eastern city. In replying, state previous experience.**

P-419, Elect. Railway Journal,
10th Ave. at 36th St., N. Y. City

## ELECTRIC RAILWAY EXECUTIVE

There is an opportunity open in a large advertising service department for a man familiar with conditions existing in the electric railway industry, and the equipment bought and used, to capitalize upon his experience and become a trained advertising man with good chances for future development; his job will be planning and writing advertising copy for a leading technical publication covering the electric railway field; his work will be creative and interesting; he will enter upon a line of endeavor which offers a growing future; technical advertising writers in specialized fields are in demand; we can use the right man immediately; let your letter cover your experience fully.

P424 Elect. Railway Journal,
10th Ave. and 36th St., N. Y. City.

WANTED

## OIL SALESMAN

A large corporation has need for an oil salesman to handle lubricating oils in the steam and electric railway trade.

He should be preferably a graduate engineer, who has had practical experience in locomotive and car shops, or at least has a good knowledge of shop conditions.

He must have had previous selling experience or be able to demonstrate sales ability. State qualifications in detail as to education and experience.

AS418-Electrical Railway Journal
935 Real Estate Trust Bldg., Phila., Pa.

## EMPLOYERS

Send us your inquiries for men of technical training and experience. We are obtaining employment for soldiers, sailors and marines released from the service.

Re-Employment Bureau of New York City for Soldiers, Sailors and Marines, 505 Pearl Street, north of Municipal Building, Professional Section, Worth 9250.

Keep your eye on the Searchlight and your advertisements in it.

MACHINERY

# WANTED

MISCELLANEOUS

WANTED

*For Immediate Delivery*

**One Rotary Converter**

or

**Synchronous Motor Generator**

with necessary transformers. 13,200-volt, 3-ph., 60-cy., for 550-600-volt D.C.

**Rockingham County Light & Power Co.**
Portsmouth, N. H.

WANTED

**Gasoline Passenger Car**

Standard gauge, seat 28 to 32, with Baggage Compartment, in good operating condition. Send photo, full description and price.

S. S. BUSH, Prest.
Columbia Bldg., Louisville, Ky.

WANTED AT ONCE

Five new or slightly used P. A. Y. E. double truck

**Steel Trolley Cars**

approximately 45 ft. overall; 20 tons; equipped with West. or G. E. 50-hp. motors, control and air brakes.

SCHUYLKILL RAILWAY CO.
2035 Washington Ave., Philadelphia, Pa.

# MACHINERY AND EQUIPMENT OF ALL KINDS FOR STEAM, ELECTRIC AND HYDRAULIC POWER PLANTS, RAILROADS, MANUFACTURING PLANTS AND MACHINE SHOPS

We Sell the following equipment New, from manufacturers. We also Buy and Sell used equipment for immediate delivery. Our Engineering and Construction Department will design, construct and assist you to finance your undertaking. Write us particulars.

## LOOK OVER THE FOLLOWING

**Don't you need to BUY or SELL some of these items?**

## WRITE US ABOUT IT NOW

AND MENTION THIS PAPER

- **Cars**
  - **Passenger**
  - **Freight**
  - **Industrial**
- **Car Equipment**
  - **Ry Motors**
  - **Air Brakes**
- **Locomotives**
- **Cranes**
- **Steam Shovels**
- **Buckets**
- **Rails**
- **Lock Washers**
- **Bridges**
- **Tanks**
- **Cable-ways**
- **Concrete Mixers**
- **Hoists**
- **Crushers**
- **Steel Piling**
- **Steel Towers**
- **Pipe**
- **I-Beams**
- **Turbines**
- **Generators**
- **Power Motors**
- **Motor Generators**
- **Transformers**
- **Engines**
- **Gas Blowers**
- **Boilers**
- **Condensers**
- **Heaters**
- **Pumps**
- **Stacks**
- **Accumulators**
- **Air-Compressors**
- **Air-Receivers**
- **Axle Lathes**
- **Bolt Cutters**
- **Boring Bars**
- **Boring Mills**
- **Bulldozers**
- **Cutters**
- **Cut-off Machines**
- **Drilling Machines**
- **Drill Presses**
- **Forging Machines**
- **Gear Cutters**
- **Grinders**
- **Hammers**
- **Jacks, Hydraulic**
- **Joggling Machines**
- **Keyseaters**
- **Lathes**
- **Milling Machines**
- **Nut Machines**
- **Pipe Machines**
- **Planers**
- **Presses**
- **Profilers**
- **Punches**
- **Riveters**
- **Rolling Mills**
- **Rolls**
- **Saws**
- **Screw Machines**
- **Shapers**
- **Shears**
- **Shipyard Machinery**
- **Slotters**
- **Steel Buildings**
- **Testing Machines**
- **Tin Plate**
- **Wheel Borers**
- **Wheel Lathes**
- **Wheel Presses**

### AIR-COMPRESSORS

1200 ft. I-R, 2-stage motor drive, with receiver.
1190 ft. I-R 22-13 x 16 Duplex motor drive.
1000 ft. Norwalk, 2-stage steam.
960 ft. Laidlaw-Dunn Gordon, 12-20 x 18 duplex steam.
599 ft. I-R 10-16 x 14, motor drive.
550 ft. Laidlaw-Dunn-Gordon, 12-20 x 18 duplex steam.
489 ft. I-R, 14-16 x 18, steam.
400 ft. Rand Drill, 16-10 x 12, duplex belt.
350 ft. I-R 10-16½ x 10½ steam.
200 ft. Chicago Pneumatic, 10-10 x 10 steam.

### BOILERS

508, 500, 300-hp. B. & W., WT, 160-lb. working pressure.
250-hp. Erie City, 140 lb.
250-hp. B. & W., WT, 160 lb.
150-hp. B. & W., 125 lb.
100-hp. Ames Locomotive, 125-lb. stack.
50-hp. O. & S. Locomotive, 100-lb. stack.

### BOLT AND NUT MACHINES

3-in. Acme Bolt Cutter, with 6-spindle nut tapper.
1-in. Landis Bolt Cutter, 7 sets chasers

### BORING MACHINES

5 -in. Barrett type, bar 12 ft, 40-in. swing.
5 -in Beaman & Smith Boring, Drilling, Mill
4 -in. Beaman & Smith Bar Cylinder Borer.
3 -in. Sellers, knee type, 40-in. swing.
2½-in. Bement, knee type, 54-in. swing.

### BORING MILLS

51-in. Bridgeport, 2 heads.
38-in. Bausn, 2 heads.
40-in. Brown & Sharpe No. 2, vertical turret chucking.
30-in. Niles, also Bridgeport.

### DRILLS—UPRIGHT

42-in., 36-in. Gould & Eberhardt, Blaisdell.
24-in. Fitchburg. Also electric drills.

### DRILLS—RADIAL

5-ft. Prentice, plain taper attachment.
4-ft. Prentice, plaing swing arm type.
42-in. Prentice, plain.
2½-ft. Mueller square swing table.

### DRILL PRESSES

3, 4 and 6-spindle Foote-Burt, Henry & Wright Sipp, Leiand and Gifford.
5- and 6-spindle horizontal and rotary.
23-in. Rockford, 28-in. Rockford.

### ELEVATORS

4000-lb. freight.

### GEAR CUTTERS

54-in. Sellers, auto spur and bevel.
48-in. Hewes & Phillips, spur and bevel.
22-26-in. Bilgram System Bevel Generator, 8-26 in.

### GRINDERS

No. 3 Wilmarth & Morman, surface.
No. 60 Heald.
Gisholt, No. 2 Oakley, Thompson, Universal.
14 x 36 Bridgeport, cylindrical.
Blanchard, direct drive, with 20-hp. motor.
Van Norman Int. No. 3, also combination No. 4.
No. 1 Morse, cylindrical universal.
No. 2 Morse, No. 2 B. & S. surface.
No. 11 B. & S., plain, also Universal.
No. 3 Union Twist Drill, circular.
No. 2 Union Twist Drill, form cutter.
No. 1 Universal Cutter and Reamer.

### HAMMERS

6000, 7000, 8000-lb. steam forging.
4500-lb. Bement Forging.
1600-lb. Billings & Spencer, drop.
1100-lb. Erie, drop.
600-lb. Merrell, board lift drop.
500-lb. Miles, steam, 500-lb. Sellers.
100, 125, 150, 200-lb. Beaudry.

**80,000-lb. Riehle Testing Machine.**
**8000-lb. steam forging hammer.**
**54-in. slotter massive type.**
**36-in. shaper massive type foundry.**
**1½-yd. steam shovel Marion model 20.**
**5-ton EOT crane 3 motors.**
**15-ton Brownhoist stdg 40-55-ft. boom with bucket.**

### KEYSEATERS

No. 0 Baker Bros., 1 x 9, full equipment, 18-in. compound table.

### LATHES

92 x 31½-in. Stoever, triple geared.
42-64-in. x 19-ft. Fitchburg, triple geared.
38-44-in. x 14-ft. Fitchburg.
40-in. x 13-ft. Putman, triple geared.
26-in. x 18-ft. Bullard, rapid production, 20-hp. motor.
25-in. x 14-ft. Reed, Q.C.
24-in. x 20-ft. New Haven, also 14-in. x 5-ft. and others.
26-in. x 9-ft. Bridgeford.
30-in. x 14-ft. LeBlond, loose gear.
24-in. x 12-ft. New Haven, loose gear.
20-in. x 10-ft. Hamilton, D.B.G., complete.
20-in. x 8½-ft. Lodge & Shipley, Q.C.G.
18-in. x 8-ft. Whitcomb-Blaisdell, Q.C.G.
8 x 60 Lo-Swing.

### TURRET LATHES

3½ x 4½-in. National-Acme Gridley, 4-spindle.
3½ National-Acme Gridley, single spindle.
No. 3-A Warner & Swasey.
34-in. Gisholt taper attachment, also 20-in.
20-in. Simplex auto Potter & Johnson.
20-in. Cleveland, 5-spindle, turret chuck.
20-in. x 6-ft. Bullard, friction, B.G.
2 x 24 Jones & Lamson, cone feed.

### MILLING MACHINES

48 x 36 x 14-ft. Ingersoll, 4-spindle, adjustable rail
Nos. 4, 5 Brown & Sharpe, plain.
No. 4 Smith & Garvin, plain.
No. 2 Lodge & Davis, plain.
No. 2 Hilles & Jones, vertical.
BrainardSlab, table 7 ft. x 20 in.
No. 2 Cincinnati Universal.
No.2-B Hendey & Norton.
No. 2½ Rockford Universal.
No. 1 Kempsmith, plain, also Universal.
Type A Briggs, Gooley & Edmund.
Nos. 12, 15, 21 Garvin.
No. 8 P. & W., automatic.
Nos. 0, 11, 12 Brown & Sharpe No. 2 vertical.
No. 7, No. 25 Becker.

### PIPE MACHINES

2-in. Merrell Pipe and Nipple Cutter.
6-in. Curtiss & Curtiss Dies, 1½ to 6 in.
6-in. Saunders.
8-in. Merrell Dies, 2½ to 8 in.
8-in. Jarecki Dies, 2½ to 8 in.

### PLANERS

60 x 60 x 12-ft. Pond, 3 heads.
54 x 54 x 12-ft. Pond, 4 heads.
48 x 48 x 16-ft. Powell, 4 heads.
42 x 42 x 12-ft. H. & P., 2 heads.
34 x 34 x 10-ft. P. & W., 1 head.
32 x 32 x 8-ft. Pond, 2 heads.
32 x 32 x 8-ft. New Haven
30 x 30 x 8-ft. Cincinnati
24 x 24 x 6-ft. Cincinnati

### PUNCHES AND SHEARS

No. 2 Thomson, bevel plate, 1 in.
No. 2 H. & J., guillotine bar, 8½-in. knives.
26-in. Cleveland SE, punch 1 in., 1 in.
14-in. throat SE, portable punch, hand or power.
No. 4 Long & Alstatter double end Punch and Shear.
No. 13 10-in. Williams & White single end Punch and Shear.

### SHAPERS

36-in. Wetherill massive type foundry, 30,000 lb.
16, 20, 24-in. Cincinnati.
16, 20-in. Kelley.
20-in. Rockford, 20-in. Smith & Mills.
16-in. Ohio, 16-in. Gould & Eberhardt, 15-in. Stockbridge.

### SLOTTERS

54-in. Hewes & Phillips, massive type.
8-in. Newton, cone drive.

### TAPPING MACHINES

¾-in. Hubbell.
No. 1-X, No. 2-X Garvin.
Hercules, Harbey Hubbell, Rickert & Shafer.

## RAILWAY & POWER EQUIPMENT COMPANY

**1321 Woolworth Building**
Cable Address: "JOHNSCAR".
Code: Western Union
**New York, N. Y., U. S. A.**

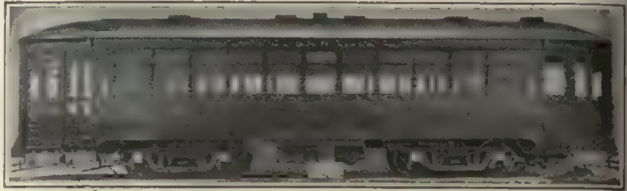
## ROTARY CONVERTERS

1—500-kw. Westinghouse Rotary Converter, 6-ph., 600-v. D.C., 430-v. A.C., 600 r.p.m.
1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

## TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
*Telephone* 4337-4338 *Rector*



## IMMEDIATE DELIVERY

Five new P.A.Y.E. double truck cars. Length, 45-ft. Equipped with 4 G. E. Co.'s 247 Motors and G. E. Co. Air Brakes.

**McGUIRE-CUMMINGS MANUFACTURING CO.**
**111 West Monroe Street, Chicago, Ill.**
*Cars and Trucks, Snow Sweepers, Electric Locomotives*

## Turbo-Generator Units

### 60 CYCLE

10,000 Kw. Westinghouse Parsons Horizontal Turbo Generator Unit, 3-phase, 60-cycle, 13,800 volts, 1800 RPM. Can be reconnected for any other standard voltage. Absolutely new. Suitable surface condenser and condenser auxiliaries. Send for full details and specifications.

### 25 CYCLE

6500 Kw. Allis-Chalmers Horizontal Turbo Generator Unit, 3-phase, 25-cycle, 6600 volts, 4 pole, 750 RPM. Send for full details and specifications.

***We have these units in stock for immediate shipment. We own them and are not acting as brokers.***

**MACGOVERN & COMPANY, Inc.**
**114 Liberty Street, New York, N. Y.**
**Pittsburgh Office, 498 Union Arcade Building**

S EARCHLIGHT
S ERVICE
S ECURES
S ATISFACTORY
S ITUATIONS
S ALES

816

FOR SALE

Lorain 34—500-volt

## ARMATURE

newly rewound, good commutator and shaft, $100. We wind armatures, refill commutators and manufacture field coils.

**DOUBLEDAY-HILL ELECTRIC CO.**
719 Liberty Ave., Pittsburgh, Pa.

## RATES:

1 inch—$3.00
4 inches—$2.90 an inch

*(The above rate applies to a 4-inch space in one issue, a 2-inch space in two issues, or a 1-inch space in four issues. The larger spaces following may be used up in a similar way.)*

8 inches—$2.80 an inch
15 inches— 2.70 an inch
27 inches— 2.60 an inch

FOR SALE

## 80-LB. NEW SHANGHAI RAIL

***At Attractive Price***

Specially adapted for brick or asphalt paving. Let us have your inquiries, for above, or any weight rail, new or relayers.

***Our Prices Are Right***

**THE WILKOFF COMPANY**
**First National Bank Bldg., Pittsburgh, Pa.**
*Office and Yards:* **Youngstown, Ohio**
*New York Office:* **Woolworth Bldg.**

FOR SALE

## INTERURBAN PASSENGER CARS

With Baggage Compartment
49-ft. long over-all
Baldwin Trucks
4-W.H. 112-B motors
W.H. L-4 control.

Also Another Interurban Passenger Car

With Baggage Compartment
41-ft. 8-in. long over-all
McGuire-Cummings trucks
4 GE-226-B motors
GE K-35-G control.

**GARY & VALPARAISO RAILWAY CO.**
Gary, Indiana

## RAILS

**15,000 TONS—NEW and RELAYERS**
**NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.**
**RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.**

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

**L. B. FOSTER COMPANY**
Park Building, Pittsburgh, Pa.

FOR SALE

1—48-in. Niles Car Wheel

## BORING MACHINE

in good condition.

**POWER SUPPLY COMPANY**
Distributors of MACHINERY and SUPPLIES
EQUIPMENT ENGINEERS
TERRE HAUTE, INDIANA, U.S.A.

## WORRYLESS ELECTRICAL REPAIRS

**On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc. Remember our initials stand for our product.**

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

**EST. 1895** **4732-4-6 ST. CLAIR AVE., CLEVELAND** **INC. 1918**

# Government Sale of (New) Machine Tools

SEALED BIDS will be opened **10 A. M., July 1, 1919,**

at War Department Surplus Property Division, Munitions Building, Washington, D. C., for any of following Tools, f.o.b. points of storage, where they may be inspected:

5—**Double Punch and Shears,** No. 3A Royerford, with motors.

10—**Punches,** 24-in. throat, New Doty, Mfgrs., with motors.

2—**Hack Saw Machines,** No. 7, E. C. Atkins Co., Mfgrs., with motors.

2—**Planers,** 30 in. x 30 in. x 10 ft., with 2 heads on cross rail, Whitcomb-Blaisdell, Mfgrs., with motors.

9—**Hollow Hexagon Turret Lathes,** Warner & Swasey Universal No. 2A, with motors.

2—**Standard Lathes,** 18 in. x 22 ft., Whitcomb-Blaisdell, Mfgrs., with motors.

4—**Motor Head Pattern Makers' Lathes,** Oliver No. 25A, 16 in., with motors.

4—**Portable Floor Cranes,** No. 6 Canton, capacity 3 tons.

1—**Drill Grinder,** American Style, E. W., with motor.

2—**Grinding Machines,** Type SS, Cincinnati Elec. Co., Mfgrs., with motors.

5—**Power Grindstone Machines,** 36 in. x 4 in., with motors.

2—**Pipe Threading and Cutting-off Machines,** 300A, Oster Co., Mfgrs.

1—**Pipe Cutting and Threading Machine,** Curtis No. 69.

Full particulars and special bid forms may be obtained at above Office and Zone Supply Offices: Boston, New York, Philadelphia, Baltimore, Newport News, Atlanta, Jeffersonville, Ind., Chicago, St. Louis, New Orleans, San Antonio, Omaha, El Paso, San Francisco. **Refer to S. P. D. No. 5205 M. E.**

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Air Compressor Equipment
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12—Electric Sets.

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# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

- **Advertising, Street Car**
  - Collier. Inc., Barron G.
- **Air Rectifiers**
  - Holden & White. Inc.
- **Ammeters**
  - Weston Elec'l Instrument Co.
- **Anchors, Guy**
  - Electric Service Supplies Co.
  - Holden & White. Inc.
  - Johns-Manville Co., H. W.
  - Ohio Brass Co.
  - Western Electric Co.
  - Westinghouse Elec. & M. Co.
- **Anti-Climbers**
  - Railway Improvement Co.
- **Ash Storage Tanks, Cast Iron**
  - Green Engineering Company
- **Automobiles and Buses**
  - Brill Co., The J. G.
- **Axle Straighteners**
  - Columbia M. W. & M. I. Co.
- **Axles, Car Wheel**
  - Bemis Car Truck Co.
  - Brill Co., The J. G.
  - Cambria Steel Co.
  - Carnegie Steel Co.
  - Midvale Steel & Ordnance Co.
  - National Railway Appliance Co.
  - St. Louis Car Co.
  - Standard Steel Works Co.
  - Westinghouse Elec. & M. Co.
- **Babbitting Devices**
  - Columbia M. W. & M. I. Co.
- **Babbitt Metal**
  - Ajax Metal Co.
- **Badges and Buttons**
  - Electric Service Supplies Co.
  - International Register Co., The
  - Western Electric Co.
- **Batteries, Dry**
  - Johns-Manville Co., H. W.
  - Western Electric Co.
- **Batteries, Storage**
  - Electric Storage Battery Co.
  - Western Electric Co.
- **Bearings and Bearing Metals**
  - Ajax Metal Co.
  - Bemis Car Truck Co.
  - Columbia M. W. & M. I. Co.
  - Eureka Co.
  - General Electric Co.
  - More-Jones Brass & Metal Co.
  - St. Louis Car Co.
  - Westinghouse Elec. & M. Co.
- **Bearings, Center and Roller Side**
  - Holden & White, Inc.
- **Bearings, Roller and Ball**
  - Gurney Ball Bearing Co.
  - S K F Industries
- **Bells and Gongs**
  - Brill Co., The J. G.
  - Columbia M. W. & M. I. Co.
  - Electric Service Supplies Co.
  - St. Louis Car Co.
  - Western Electric Co.
- **Benders, Rail**
  - Niles-Bement-Pond Co.
  - Western Electric Co.
  - Zelnicker, Walter A., Supply Co., Inc.
- **Boilers**
  - Babcock & Wilcox Co.
- **Boiler Cleaning Compounds**
  - Johns-Manville Co., H. W.
- **Boiler Coverings**
  - Johns-Manville Co., H. W.
- **Boiler Tubes**
  - National Tube Co.
- **Bond Testers**
  - American Steel & Wire Co.
  - Lincoln Bonding Co.
  - Roller Smith Co.
- **Bonding Apparatus**
  - American Steel & Wire Co.
  - Electric Railway Improvement Co.
  - Electric Service Supplies Co.
  - Lincoln Bonding Co.
  - Ohio Brass Co.
- **Bonds, Rail**
  - American Steel & Wire Co.
  - Electric Railway Improvement Co.
  - Electric Service Supplies Co.
  - General Electric Co.
  - Johns-Manville Co., H. W.
  - Lincoln Bonding Co.
  - Ohio Brass Co.
  - Westinghouse Elec. & M. Co.
- **Book Publishers**
  - McGraw-Hill Book Co.
- **Boring Tools, Car Wheel**
  - Niles-Bement-Pond Co.
- **Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
  - American Bridge Co.
  - Bates Expanded Steel Truss Co.
  - Hubbard & Co.
  - Lindsley Bros. Co.
  - Ohio Brass Co.
  - Western Electric Co.
- **Brake Adjusters**
  - Holden & White, Inc.
  - Westinghouse Traction Brake Co.
- **Brake Shoes**
  - Amer. Brake Shoe & Fdry. Co.
  - Barbour-Stockwell Co.
  - Brill Co., The J. G.
  - Columbia M. W. & M. I. Co.
  - St. Louis Car Co.
- **Brakes, Brake Systems and Brake Parts**
  - Allis-Chalmers Mfg. Co.
  - Bemis Car Truck Co.
  - Brill Co., The J. G.
  - Columbia M. W. & M. I. Co.
  - General Electric Co.
  - Holden & White, Inc.
  - National Brake Co.
  - St. Louis Car Co.
  - Safety Car Devices Co.
  - Westinghouse Traction Brake Co.
- **Brazing and Welding Processes**
  - Lincoln Bonding Co.
- **Bricks, Fire**
  - Green Engineering Co.
- **Bridges and Buildings**
  - American Bridge Co.
- **Brooms, Track, Steel or Rattan**
  - Western Electric Co.
  - Zelnicker, Walter A., Supply Co., Inc.
- **Brushes, Carbon**
  - General Electric Co.
  - Jeandron, W. J.
  - Morgan Crucible Co.
  - National Carbon Co.
  - United States Graphite Co.
  - Western Electric Co.
  - Westinghouse Elec. & M. Co.
- **Brushes, Graphite**
  - United States Graphite Co.
- **Brush Holders**
  - Anderson Mfg. Co., A. & J. M.
  - Columbia M. W. & M. I. Co.
  - Eureka Co.
- **Buckets**
  - Blaw-Knox Company
- **Bunkers, Coal**
  - American Bridge Co.
- **Bushings, Case Hardened & Manganese**
  - Bemis Car Truck Co.
- **Cables. (See Wires and Cables.)**
- **Carbon Brushes. (See Brushes, Carbon.)**
- **Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.**
- **Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**
- **Car Panel Safety Switches**
  - Westinghouse Elec. & Mfg. Co.
- **Cars, Passenger, Freight, Express, etc.**
  - American Car Co.
  - Brill Co., The J. G.
  - Cambria Steel Co.
  - Kuhlman Car Co., G. C.
  - McGuire-Cummings Mfg. Co.
  - Midvale Steel & Ordnance Co.
  - St. Louis Car Co.
  - Wason Mfg. Co.
- **Cars, Second Hand**
  - Electric Equipment Co.
- **Cars, Self-Propelled**
  - Electric Storage Battery Co.
  - General Electric Co.
- **Castings, Brass, Composition or Copper**
  - Ajax Metal Co.
  - Anderson Mfg. Co., A. & J. M.
  - Columbia M. W. & M. I. Co.
  - Eureka Co.
  - More-Jones Brass & Metal Co.
- **Castings, Gray Iron and Steel**
  - American Bridge Co.
  - American Steel Foundries
  - Bemis Car Truck Co.
  - Columbia M. W. & M. I. Co.
  - St. Louis Car Co.
  - Standard Steel Works Co.
- **Castings, Malleable and Brass**
  - Amer. Brake Shoe & Fdry. Co.
  - American Malleable Castings Assn.
  - Bemis Car Truck Co.
  - Columbia M. W. & M. I. Co.
  - St. Louis Car Co.
- **Catchers and Retrievers, Trolley**
  - Electric Service Supplies Co.
  - Holden & White, Inc.
  - Kerschner Co., Inc., W. R.
  - Ohio Brass Co.
  - Wood Co., Chas. N.
- **Change Carriers**
  - McGill Ticket Punch Co.
- **Circuit Breakers**
  - Automatic Reclosing Circuit Breaker Co.
  - Cutter Electrical & Mfg. Co., The
  - General Electric Co.
  - Western Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Clamps and Connectors for Wires and Cables**
  - Anderson Mfg. Co., A. & J. M.
  - Dossert & Co.
  - Electric Service Supplies Co.
  - Eureka Co.
  - General Electric Co.
  - Hubbard & Co.
  - Ohio Brass Co.
  - Western Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**
  - Brill Co., The J. G.
  - Ohio Brass Co.
  - Van Dorn & Dutton Co.
  - Western Electric Co.
- **Clusters and Sockets**
  - General Electric Co.
- **Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**
- **Coasting Recorders**
  - Railway Improvement Co.
- **Coil Banding and Winding Machines**
  - Columbia M. W. & M. I. Co.
  - Electric Service Supplies Co.
  - Western Electric Co.
- **Coils, Armature and Field**
  - Cleveland Armature Works.
  - Columbia M. W. & M. I. Co.
  - D & W Fuse Co.
  - General Electric Co.
  - Independent Lamp & Wire Co.
  - Rome Wire Co.
  - Westinghouse Elec. & M. Co.
- **Coils, Choke and Kicking**
  - Electric Service Supplies Co.
  - General Electric Co.
  - Westinghouse Elec. & M. Co.
- **Coin-Counting Machines**
  - International Register Co., The
- **Commutator Slotters**
  - Electric Service Supplies Co.
  - General Electric Co.
  - Westinghouse Elec. & Mfg. Co.
  - Wood Co., Chas. N.
- **Commutator Truing Devices**
  - General Electric Co.
- **Commutators or Parts**
  - Cameron Electrical Mfg. Co.
  - Cleveland Armature Works.
  - Columbia M. W. & M. I. Co.
  - Eureka Co.
  - General Electric Co.
  - Western Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Compressors, Air**
  - Allis-Chalmers Mfg. Co.
  - Chicago Pneumatic Tool Co.
  - General Electric Co.
  - Westinghouse Trac. B. Co.
- **Concrete Mixers**
  - Blaw-Knox Co.
- **Condensers**
  - Allis-Chalmers Mfg. Co.
  - General Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Conduits, Underground**
  - Johns-Manville Co., H. W.
  - Western Electric Co.
- **Connectors, Solderless**
  - Dossert & Co.
  - Westinghouse Elec. & Mfg. Co.
- **Controller Fingers**
  - Eureka Co.
  - Trigger Lock Reversible Controller Finger
- **Controllers or Parts**
  - Allis-Chalmers Mfg. Co.
  - Columbia M. W. & M. I. Co.
  - Eureka Co.
  - General Electric Co.
  - Johns-Manville Co., H. W.
  - Westinghouse Elec. & Mfg. Co.
- **Controller Regulators**
  - Elec. Service Supplies Co.
- **Controlling Systems**
  - General Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Converters, Rotary**
  - Allis-Chalmers Mfg. Co.
  - General Electric Co.
  - Western Electric Co.
  - Westinghouse Elec. & Mfg. Co.
- **Conveyors Belt**
  - Portable Machinery Co.
- **Conveyors, Coal & Ash**
  - Portable Machinery Co.
- **Conveyors, Portable**
  - Portable Machinery Co.
- **Conveying and Hoisting Machinery**
  - American Bridge Co.
  - Columbia M. W. & M. I. Co.
  - Green Engrg. Co.
- **Cord, Bell, Trolley, Register, etc.**
  - Brill Co., The J. G.
  - Electric Service Supplies Co.
  - International Register Co., The
  - Samson Cordage Works.
- **Cord Connectors and Couplers**
  - Samson Cordage Works.
  - Electric Service Supplies Co.
  - Wood Co., Chas. N.
- **Couplers, Car**
  - Brill Co., The J. G.
  - Ohio Brass Co.
  - Van Dorn Coupler Co.
  - Westinghouse Trac. B. Co.
- **Cranes**
  - Allis-Chalmers Mfg. Co.
  - Toledo Bridge & Crane Co., The
  - Van Dorn & Dutton Co.
- **Creosoting. (See Wood Preservatives.)**
- **Cross Arms. (See Brackets)**
- **Crossing Foundations**
  - International Steel Tie Co.
- **Crossing Signals. (See Signals, Crossing)**
- **Crossings, Track. (See Track, Special Work)**
- **Crushers, Rock**
  - Allis-Chalmers Mfg. Co.
- **Culverts**
  - Canton Culvert & Silo Co.
- **Curtains and Curtain Fixtures**
  - Brill Co., The J. G.
  - Electric Service Supplies Co.
  - St. Louis Car Co.
- **Cutting Apparatus, Oxy-Acetylene**
  - Milburn Co., The Alex.
- **Dealers' Machinery**
  - Archer & Baldwin.
  - Cleveland Armature Wks.
  - Electric Equipment Co.
  - Foster Co., L. B.
  - Griswold Machine Co., Geo. M.
  - Hyman Michaels Co.,
  - MacGovern & Co., Inc.
  - Zelnicker Supply Co., Inc., Walter A.
- **Derailing Devices. (See also Track Works)**
  - Cleveland Frog & Crossing Co.
- **Destination Signs**
  - Columbia M. W. & M. I. Co.
  - Electric Service Supplies Co.
  - Western Electric Co.
- **Detective Service**
  - Wish Service, P. Edward
- **Dispatching Systems**
  - Western Electric Co.

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Arthur Power-Saving Recording Co.
Economy Electric Devices Co.
Railway Improvement Co.

**Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Products, Concrete**
Massey Concrete Products Co.

**Pumps**
Allis-Chalmers Mfg. Co.

**Punches, Ticket**
Bonney-Vehslage Tool Co.
International Register Co., The
McGill Ticket Punch Co.
Wood Co., Chas. N.

**Purifiers, Feed Water**
Scaife & Sons Co., Wm. B.
**Rail Grinders. (See Grinders)**

**Railway Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Rail Welding. (See Brazing and Welding Processes)**

**Rails, New**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Rails, Steel**
Carnegie Steel Co.

**Rails, Relaying**
Zelnicker, Walter A., Supply Co., Inc.

**Rattan**
Brill Co. The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Recorders, Power Saving**
Arthur Power-Saving Recorder Co.

**Registers and Fittings**
Brill Co., The J. G.
Electric Service Supplies Co.
Exell Mfg. Co., The
International Register Co., The
Rooke Automatic Register Co.

**Reinforcement, Concrete**
American Steel & Wire Co.
Carnegie Steel Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils)**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley)**

**Rheostats**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Roofing, Building**
Johns-Manville Co., H. W.

**Roofing, Car**
Johns-Manville Co., H. W.

**Rubber Specialties of All Kinds**
U. S. Rubber Co.

**Sanders, Track**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car**
Brill Co., The J. G.

**Sash Metal, Car Window**
Hale & Kilburn Corp.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**

**Seats Car. (See also Rattan)**
Brill Co., The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

**Second-Hand Equipment**
Archer & Baldwin
Cleveland Armature Wks.
Duquesne Elec. & Mfg. Co.
Electric Equipment Co.
Exell Mfg. Co., The
Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
**Zelnicker Supply Co., Inc., Walter A.**

**Shovels**
Hubbard & Co.

**Shovels, Power**
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.

**Signals, Car Starting**
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

**Signal Systems, Block**
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Western Electric Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus (See Welding Processes and Apparatus)**

**Speed Indicators**
Johns-Manville Co., H. W.

**Spikes**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds**
Johns-Manville Co., H. W.
Standard Woven Fabric Co.
U. S. Rubber Co.
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves. (See Clamps and Connectors)**

**Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

**Sprinklers, Track and Road**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Steel Forms**
Blaw-Knox Co.

**Steps, Car**
American Mason Safety Tread Co.
Universal Safety Tread Co.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

**Storage Batteries. (See Batteries, Storage)**

**Strand**
Roebling's Sons Co., J. A.

**Straps, Car, Sanitary**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron.. (See Bridges)**

**Superheaters**
Babcock & Wilcox Co.
Locomotive Superheater Co.
Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)**

**Switch Stands**
Indianapolis Switch & Frog Co.
Ramapo Iron Works

**Switches, Automatic**
Western Electric Co.

**Switches, Lock**
Weiss Switch Lock Co.

**Switches, Track. (See Track Special Work)**

**Switches and Switchboards**
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nichols-Lintern Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

**Switchboard Mats**
Western Electric Co.

**Synchroscopes**
Weston Elec'l Instrument Co.

**Tampers, Tie**
Ingersoll-Rand Co.

**Tanks Ash and Cold Storage**
Green Engineering Co.

**Tapes and Cloths. (See Insulating Cloth, Paper and Tape)**

**Telephones and Parts**
Electric Service Supplies Co.
Western Electric Co.

**Testing, Commercial and Electrical**
Elec'l Testing Laboratories

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Railway Utility Co.
Smith Heater Co., Peter

**Thread-Cutting Tools**
Williams & Co., J. H.

**Ticket Choppers and Destroyers**
Electric Service Supplies Co.

**Tie Plates**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Ties, Mechanical**
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tool Holders**
Williams & Co., J. H.

**Tool Steel**
Carnegie Steel Co.

**Tools, Track and Miscellaneous**
American Steel & Wire Co.
Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus)**

**Towers and Transmission Structures**
American Bridge Co.
Johns-Manville Co., H. W.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Blaw-Knox Co.
Westinghouse Elec. & Mfg. Co.

**Track, Special Work**
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Indianapolis Switch & Frog Co.
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.

**Transfers. (See Tickets)**
Archbold-Brady Co.

**Transfer Tables**
American Bridge Co.

**Transformers**
American Bridge Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stair, Car Step**
American Mason Safety Tread Co.
Universal Safety Tread Co.

**Trolley Bases**
Anderson Mfg. Co., A. & J. M.
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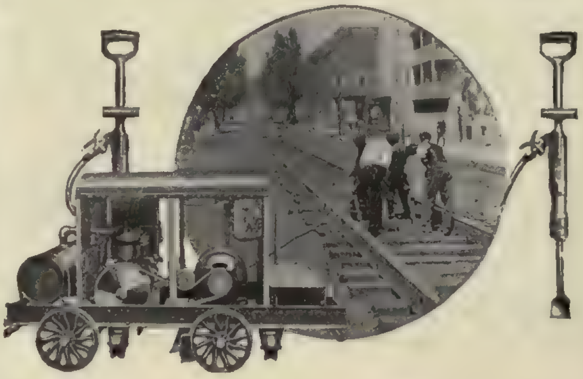

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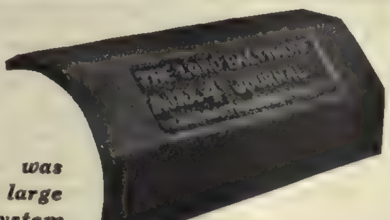

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cars and station steps.

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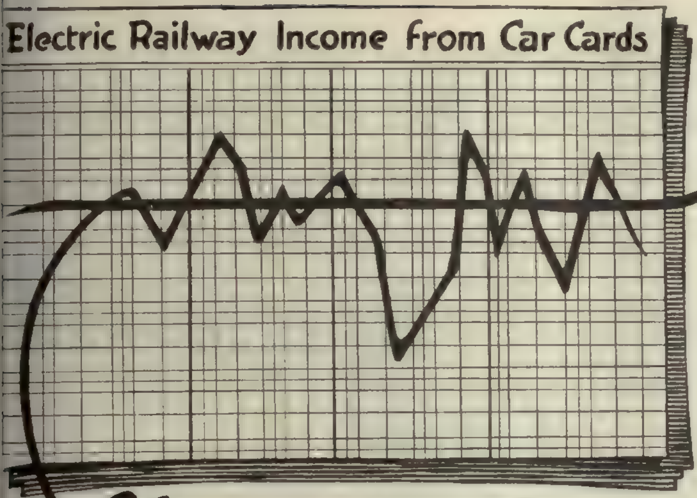
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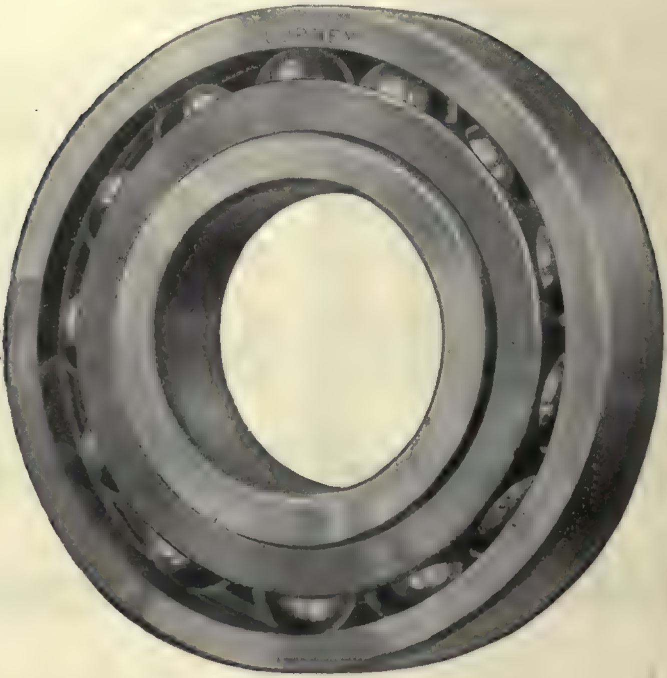

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The successful application of ball bearings where a few years ago they were out of question is due not altogether to the improvements in ball bearings. Together with these there has developed a definite branch of mechanical engineering

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We maintain a Service Engineering Department to make this special knowledge available for designing engineers.

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**GURNEY BALL BEARING CO.**
**Conrad Patent Licensee**
**JAMESTOWN, N. Y.**

357

**GURNEY**

# THE BRILL 27-MCB TRUCK

## for Heavy Electric Traction

THIS truck has four vitally important features that commend it to the careful attention and investigation of the Master Mchanics of the steam railway companies installing or conteplating the installation of electrified sections.

hese features are Solid Forged Sideframes, a Graduated Sing System, Bolster Guide and Side Swing Dampener.

he Solid Forged Sideframes provide the utmost strength a insure permanent squareness. Their simple form and able section enables bulb angle transoms to be secured with -over gusset plates, and double and single corner brackets.

piral springs between the elliptics and the bolster are anged to act under ordinary loads and automatically cease acting when the body is heavily loaded. Thus the Graduated Spring System provides easy riding at all times.

The Bolster Guide does away with chafing plates and keeps the bolster "floating" freely on its springs regardless of brake or motor pressure.

A simple and effective device is the Side Swing Dampener which allows side easement but at the same time prevents any tendency of the body to sway.

And there are other special features only to be found in Brill trucks, such as "Half-ball" Brake Hanger, self-adjusting, self-cleaning and noiseless; Oil-retaining Center Plates, etc. All are described in the Brill 27-MCB Truck Bulletin which gives dimensions, capacity of the seven sizes and other details. Copies will be gladly sent on request.

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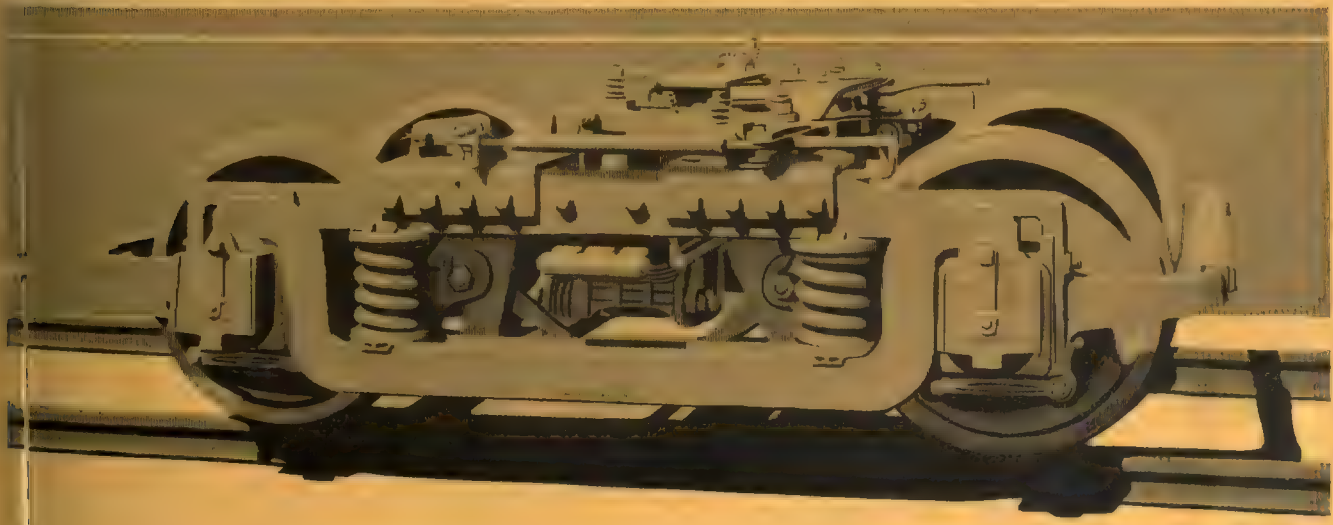

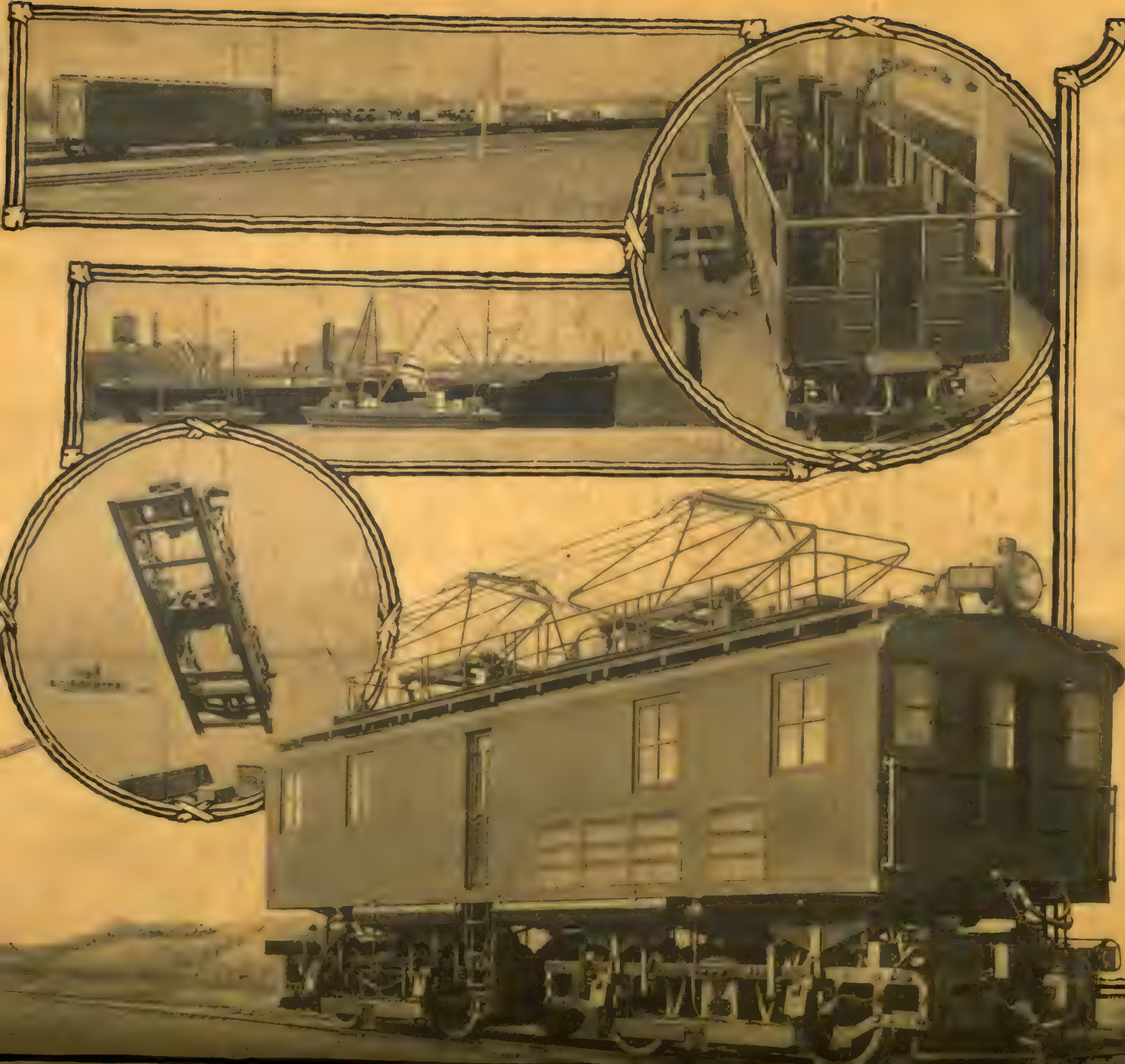

# Globe Travelers

G-E electric locomotives have been built and shipped to practically every section of the world. Back and forth across the Rockies; in Japan collieries; and on the lines from the mines to the sea in Chile.

Electric Locomotives made and equipped by this company are doing well the work demanded of them.

One of the locomotives for Chile is shown on this page in the various stages of disassembly, transportation by rail and shipment by water.

25-30

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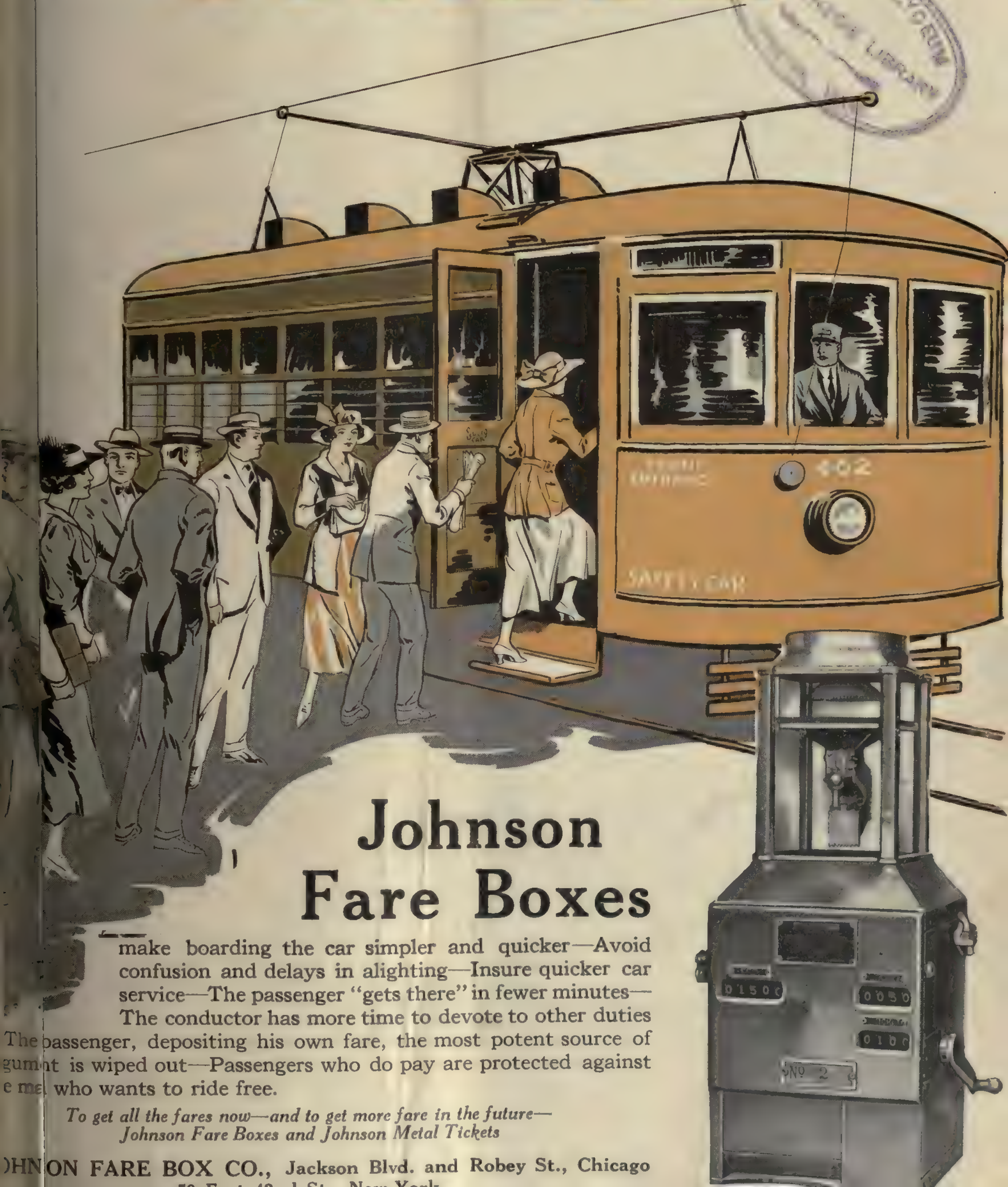

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make boarding the car simpler and quicker—Avoid confusion and delays in alighting—Insure quicker car service—The passenger "gets there" in fewer minutes—The conductor has more time to devote to other duties

The passenger, depositing his own fare, the most potent source of gum nt is wiped out—Passengers who do pay are protected against e m who wants to ride free.

*To get all the fares now—and to get more fare in the future—*
*Johnson Fare Boxes and Johnson Metal Tickets*

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# Westinghouse

HELICAL GEARS FOR CITY CARS
W
WESTINGHOUSE ELECTRIC

The rattle and crash of thunder are alarming, but it is the lightning back of the thunder, and the damage which lightning causes, that gets the operating man out of bed at night. He hails the rainbow with a sigh of relief when he finds that another storm has been safely weathered.

The noisy rattle of spur gearing on city cars is not only annoying, but it is the vibration back of the noise, with the accompanying general deterioration of equipment which vibration causes, that keeps the master mechanic on the jump. This is the reason why he welcomes the introduction of—

## Silent Nuttall Helical Gears For City Cars

Long Trials in Railway Service Have Proved That—
Helical Gears Eliminate Vibration.
Helical Gears Operate Silently.
Silence Means Low Maintenance.

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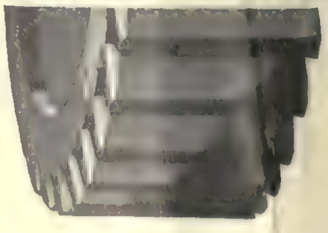

**R. D. Nuttall Company**
Pittsburgh, Pa.

*Vol.* 53, *No.* 25 New York, June 21, 1919 *Pages* 1201 *to* 1254

# Electric Railway Journal

H. W. BLAKE, *Editor*

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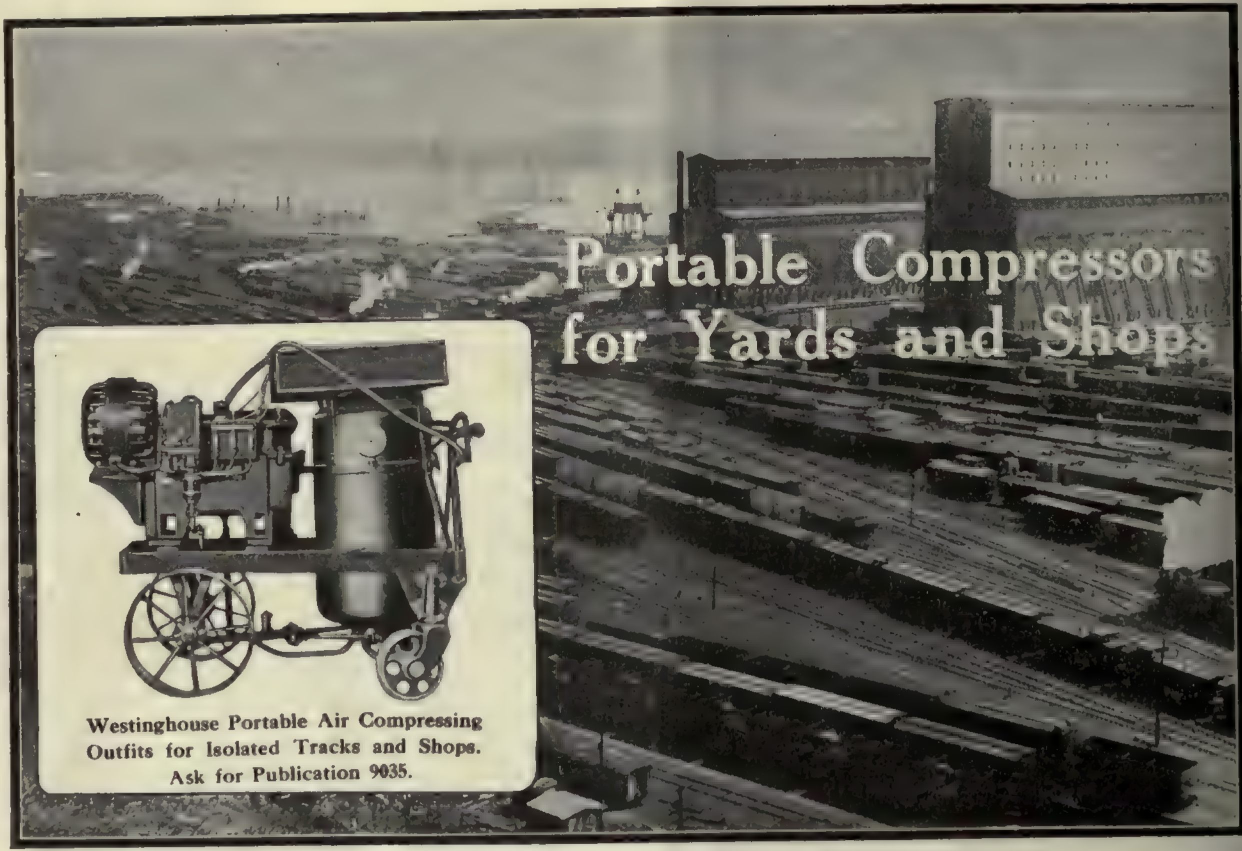

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Isolated yard tracks and smaller shops are often denied compressed air because they are located remote from the central plant.

**Westinghouse Portable Air Compressing Outfits,**

which can be wheeled anywhere at will and be plugged in on any light or power circuit, will supply compressed air for all such purposes.

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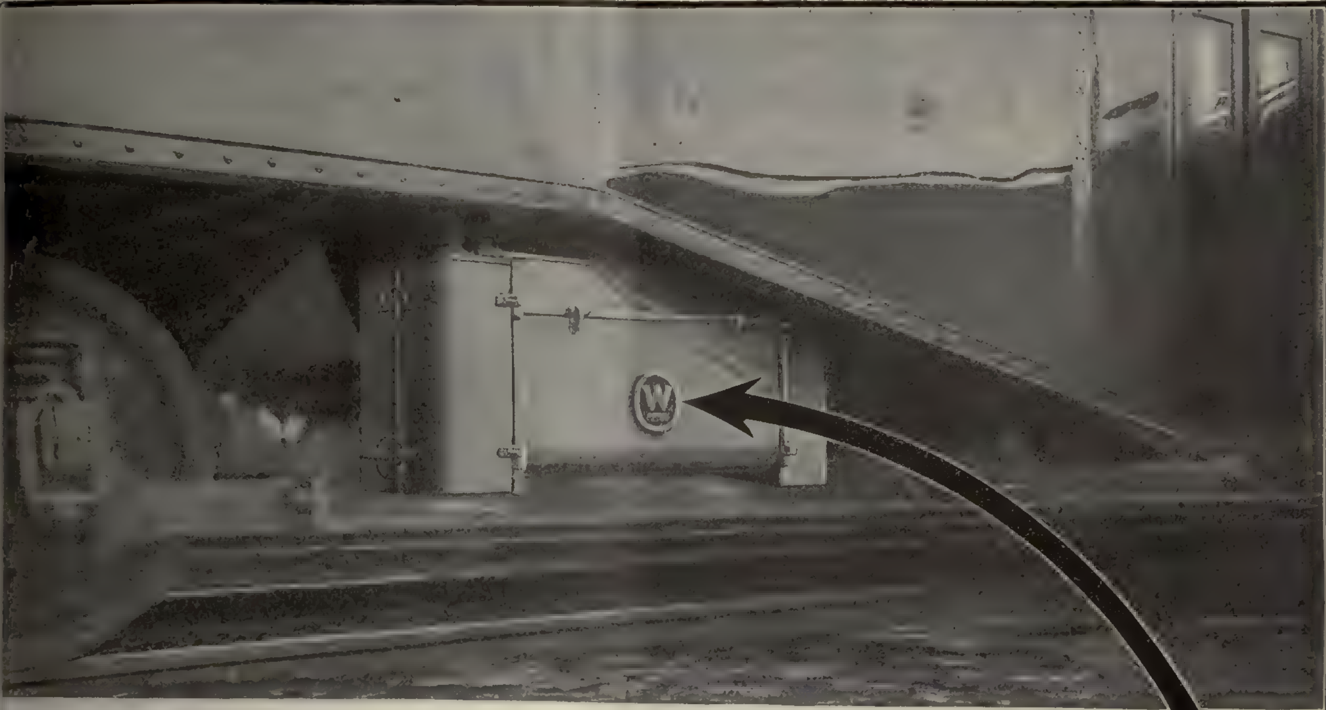

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Durability and Reliability in Service

Nine new center-entrance, all steel interurban cars, of the Wheeling Traction Company, Wheeling, W. Va., have just been equipped with HL Control and quadruple Westinghouse No. 532 motors.

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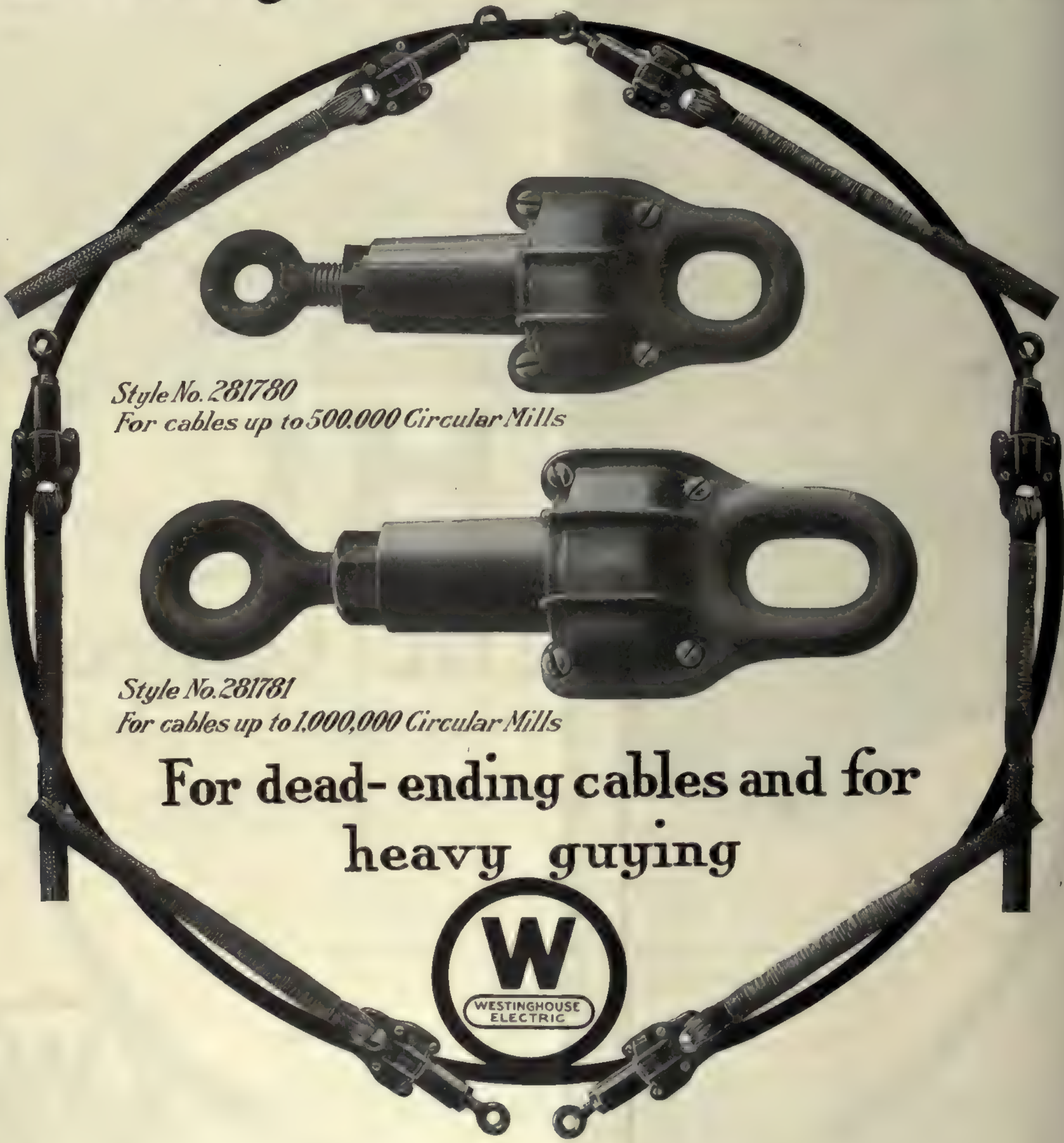
Sales Office in All Large American Cities

W
WESTINGHOUSE ELECTRIC

Westinghouse

# Westinghouse Brooklyn Strain Insulators



*Style No. 281780*
*For cables up to 500,000 Circular Mills*

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*For cables up to 1,000,000 Circular Mills*

For dead-ending cables and for heavy guying

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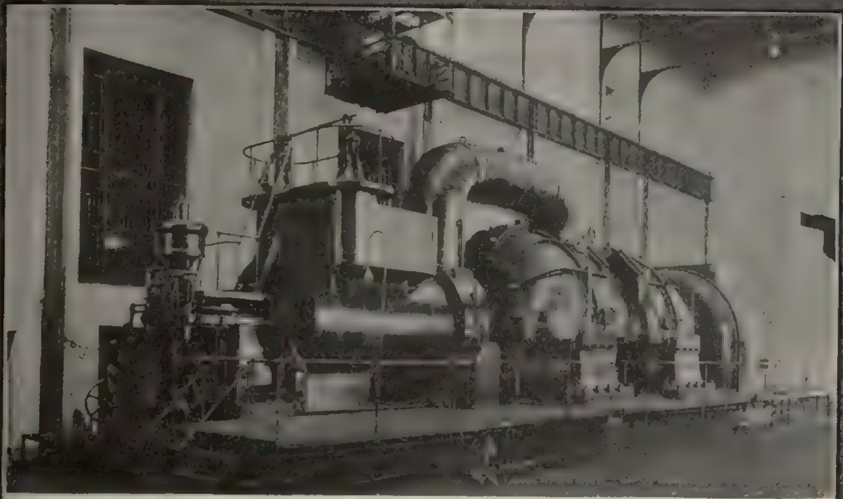
East Pittsburgh, Pa.

**Westinghouse**

# Operating History of Westinghouse Turbine Units of 30,000 Kw. and Higher



A 35,300 Kva. Westinghouse Tandem Compound Turbine-Generator Unit at the Northwest Station of the Commonwealth Edison Co., Chicago, Ill.

*This space will be used to give the operating history of our steam turbine-generator units which have been installed in sizes of 30,000 kilowatts and larger. The series will cover a record to date of their performances, of any troubles they have had, and perhaps some interesting features connected with their use. There will be eight articles, embracing eleven of these large units.*

---

## ARTICLE NO. 2

### Operating History

This is a 60-cycle, 3-phase, 12,000-volt unit, the turbine having separate high and low-pressure cylinders arranged in tandem. Operating conditions 220 pounds steam pressure, 200° superheat and 29″ vacuum. The machine has reaction blading throughout.

### Capacity Availability

This unit has been running about 90 per cent of the total hours from date of starting, September 14, 1917, to the present time. It ran from October 24th, 1917, to January 1st, 1918, without shutting down, when it was taken off to clean condensers. Ordinarily it is shut down at week ends for eight to ten hours for condenser cleaning. It has carried up to 39,000 Kw., but is usually operated near its most efficient point of about 25,000 Kw. The maximum guaranteed safe operating temperature of the generator is 150 degrees C. Under conditions of maximum load and highest summer heat, the operating temperature does not exceed 132 degrees C. Air washers are installed for cleansing and cooling the inlet air.

### Outages

A few hours after unit was put into service the labyrinth packing on the low-pressure element failed. We believe it was caused by buckling of turbine cylinder due to rigid piping connections between the two surface condensers, preventing the condensers translating with the turbine as the temperature increased. The machine being urgently needed, temporary repairs were made, the packing being removed, also the spindle holding ring, the stationary ring being trued up for temporary use. The machine has been operating in this condition ever since, at slightly less efficiency, the permanent repair parts of an improved design being on the ground to be put in when the unit can be spared.

A duplicate of the above unit has since been installed in the same station. This will be covered in a later article.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

WESTINGHOUSE ELECTRIC

**Westinghouse**

# High Spots of Safety Car Experience from a City of 23,000—

"We find that the schedules are being maintained better than formerly, when heavier, two-man equipment was used." Car for car, too!

"Our receipts have been considerably increased, owing to the better schedule and the use of fare boxes."

"The increased receipts together with the decreased costs have had a very favorable effect on our net earnings."

"Some men have given up day runs on two-man cars in order to get night runs on one-man cars."

Don't say "That's all right in a small town, but it wouldn't go here."

There's no town too big for SAFETY CAR operation.

## IT IS A SAFETY CAR ONLY

When equipped with automatic, laborless apparatus, so interlocked that, regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air-brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air-brakes must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

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CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

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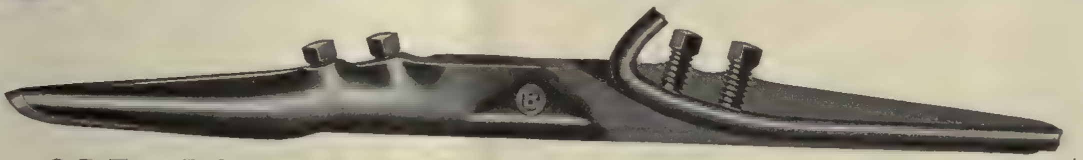
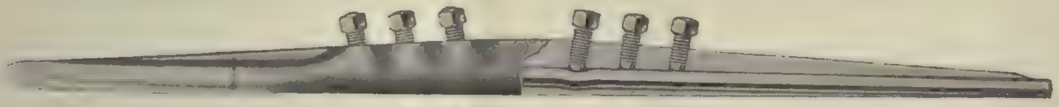


O-B Type D Splicer, 20 inches long—Patented. Also made with boss. For heavy duty. Especially recommended for Phono-electric and steel trolley.



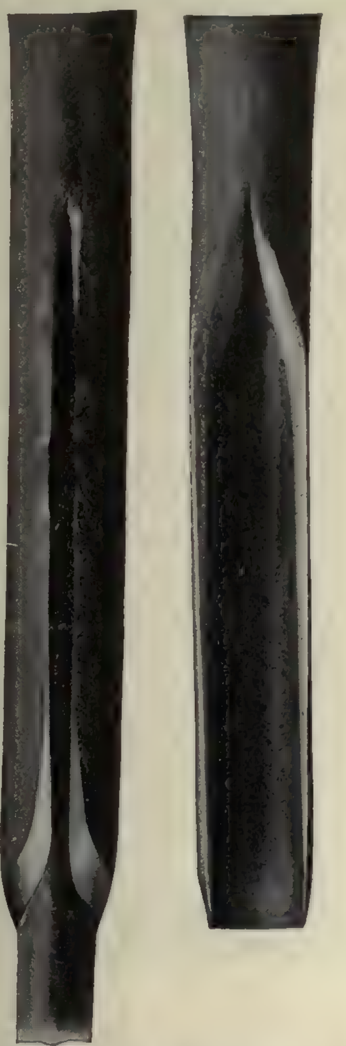
O-B Type C Splicer, 20 inches long—Patented. Also made with boss. Much used to keep worn trolley wire in service. Essentially a city type of splicer.

## Long Wire Life
## Long Splicer Life

Trolley wire lasts longer with O-B Type C and Type D Splicers. The wire enters practically in a straight line and so avoids sharp bends which lead to crystallization and rapid wear.

The life of the wire is still further lengthened by the "Lily" approach—an exclusive O-B feature. The lips fit snugly around the wire and provide a smooth, arc-reducing path for the wheel.

Because of the smooth approach and arcless underrun, because of their tough, strong bodies—O-B Type C and Type D Splicers endure.



The Lily Approach—Patented. The lips are designed like a split tube—when clinched on the wire they fit.

**THE OHIO BRASS COMPANY**
**Mansfield, Ohio**

New York
Chicago

Philadelphia
Los Angeles

Pittsburgh
San Francisco

# Phono-Electric

## Doesn't Mind the Grind

Whether it is on tangents or on curves, Phono-Electric withstands best the grinding of the trolley wheel.

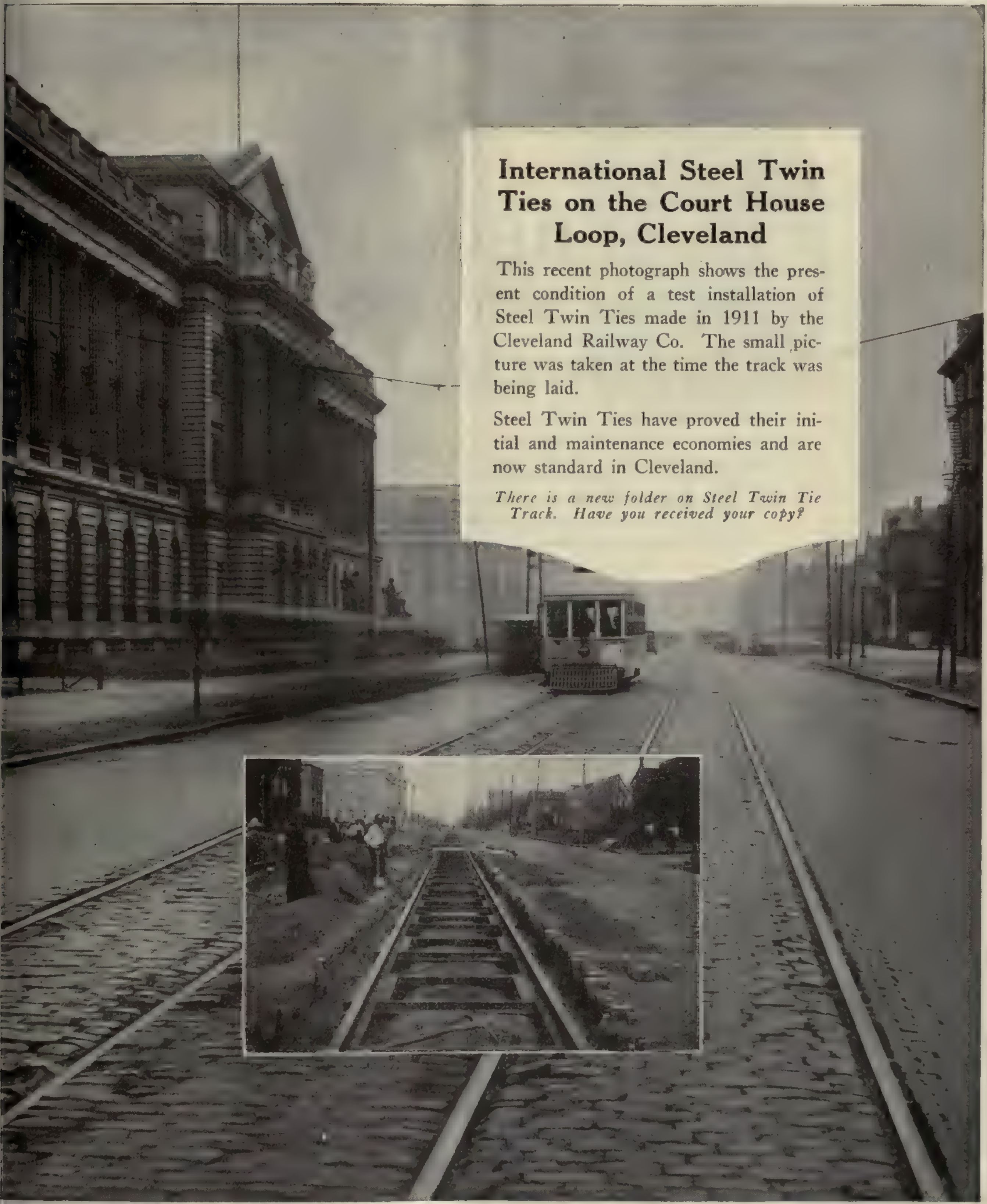
The Portland, Oregon, Railroad, Light & Power Company thinks so, evidently, for it has Phono-Electric on many curves and also on 8 miles of double track.

Variations in alignment and in the positions of the trolley base may not look big to the eye, but just ask the line foreman why he wants something that will meet the conditions best—in short why he wants

***Phono-Electric***

## Bridgeport Brass Company

Bridgeport Connecticut



## International Steel Twin Ties on the Court House Loop, Cleveland

This recent photograph shows the present condition of a test installation of Steel Twin Ties made in 1911 by the Cleveland Railway Co. The small picture was taken at the time the track was being laid.

Steel Twin Ties have proved their initial and maintenance economies and are now standard in Cleveland.

*There is a new folder on Steel Twin Tie Track. Have you received your copy?*

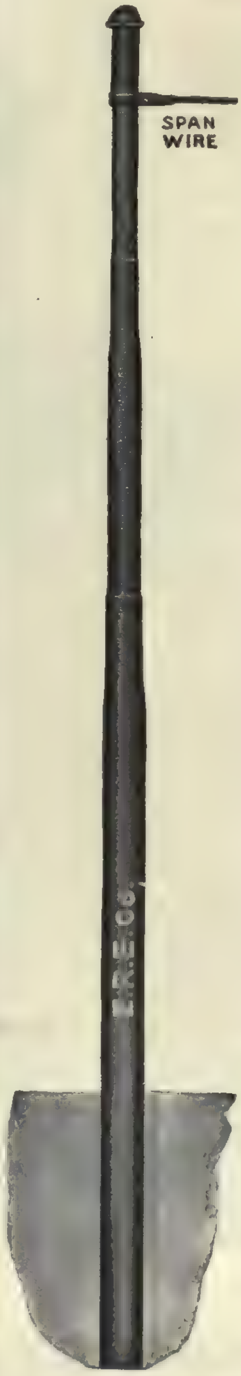
# The International Steel Tie Company

**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

Elreco Tubular Poles combine
Lowest Cost / Lightest Weight
Least Maintenance / Greatest Adaptability

# The ELRECO Tubular Pole Is the strongest Practicable Pole



ONE of the most efficient structural shapes known to engineers is the I-beam. But in utilizing an I-beam due care must be given to its installation with respect to the maximum strength of the section and the load to be carried.

The impracticability of such a structure for withstanding strains in all directions is self-evident.

The only shape that combines the highest limit of efficiency in unit weight for all-around strength is the circular tube.

As the circle is the symbol of perfection in geometry, so is the tube the symbol of perfection in poles.

For solid proof consider this case. A 30-ft. Elreco Tubular Pole made up of 6-in., 5-in. and 4-in. sections, will weigh about 50 lb. lighter and cost about $1.00 less than any other form of metal pole of the same all-around strength.

Elreco Tubular Poles are not in use by hundreds of thousands because they were the only ones available in the past, but because they were and are the best.

Elreco Tubular Poles have made good at all times as the best poles, against every other form, style and shape of pole conceivable.

In the City of Chicago more than 50,000 Elreco Poles are in service. Other cities throughout the world have their proportionate share.

Observe the WIRE LOCK

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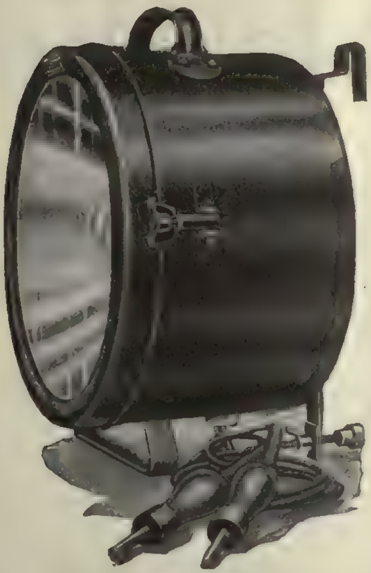

For Interurban Service

For Interurban Service

# "Golden Glow"

## Ideal for Interurban Service

The various types of "Golden Glow" Headlights for interurban service all project powerful, penetrating, steady, non-blinding beams of "Golden Glow" light—a volume of light actually greater than the average arc headlight projects.

The secret lies in the high efficiency of "Golden Glow" greenish glass reflectors and the general make-up of the headlight through and through.

Therefore when you adopt "Golden Glow" on your cars you are buying headlights correct in principle and design.

Place your order now, and soon your cars will be headed by beams of cheery "Golden Glow."

**ELECTRIC SERVICE SUPPLIES CO.**

***Manufacturer of Railway Material and Electrical Supplies***

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**50 Church Street**

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**Monadnock Building**

**Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg**

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ERICO Portable Welder

for
Building Up
Broken
Switch Points

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Welding
Rail Bonds

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Convenience
—two men can easily handle it

for
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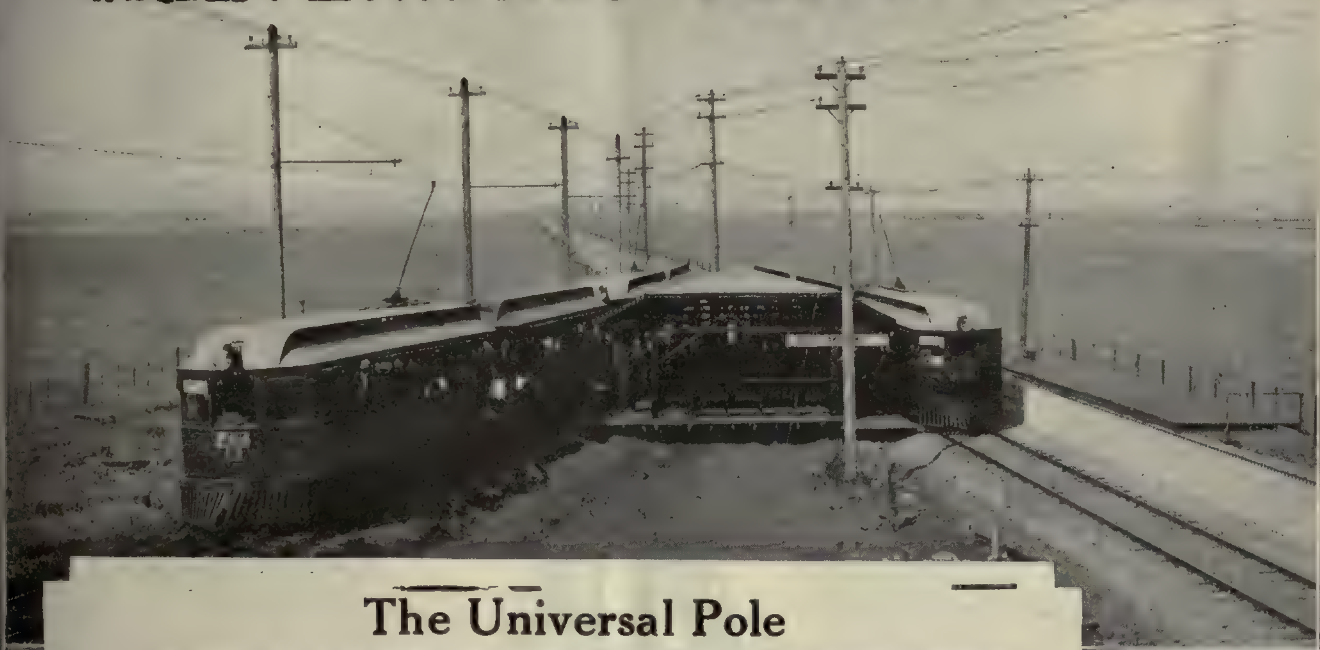
Box 251, G. P. O., Melbourne, Australia

# WESTERN RED CEDAR POLES



## The Universal Pole

Wherever the facts are known about Western Red Cedar poles, whether at home in the mountains where they are grown or 2,000 miles away on the Atlantic sea border, there they are used by progressive utility companies.

Because of the non-conducting and strong, straight and sightly qualities of these long lived poles, once they are set maintenance costs at once decrease.

The upper picture shows Western Red Cedar poles in the lines of the Spokane & Inland Empire Electric Railway at Liberty Lake Junction. Lower picture shows the lead at the mouth of the Cascade Tunnel on the Great Northern Railway Electrification.

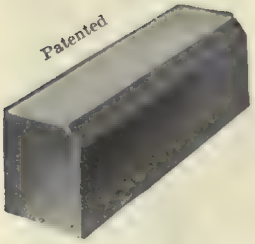
**Western Red Cedar Association**
**Peyton Building, Spokane, Wash.**

*It Will Pay to Butt-Treat Your Poles.*

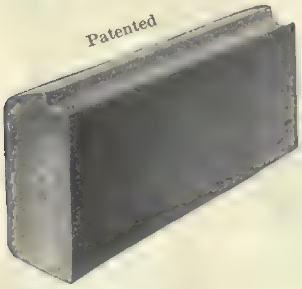
# Nelsonville

## Every Brick

## Perfectly Aligned



**Nelsonville Stretcher Brick**



**Nelsonville Filler Brick**

These bricks are laid *without grouting.*

They positively absorb vibration and shock.

They are the shortest way of obtaining a permanent, tight, level pavement with the minimum of paving repairs.

They permit the use of the old reliable, economical T-rail in street-car tracks, without the danger of "Kick-ups."

*THE PROOF of all our claims is in our booklet, "Rail Brick of the Right Sort"—shall we send it?*

**THE NELSONVILLE BRICK CO.**

**Nelsonville, Ohio**

CROWN
Rail Bonds

Made by

American Steel & Wire Company

Chicago
New York
Cleveland
Pittsburgh
Denver
U. S. Steel Products Co.

11000 volt Catenary—Pennsylvania Railroad—Main Line
Philadelphia—Paoli Electrification

Showing installation of Crown Rail Bonds—Two 1/0 bonds per joint—Each bond has separate socket terminal soldered to stub end after threading beneath and without removing the splice bars.

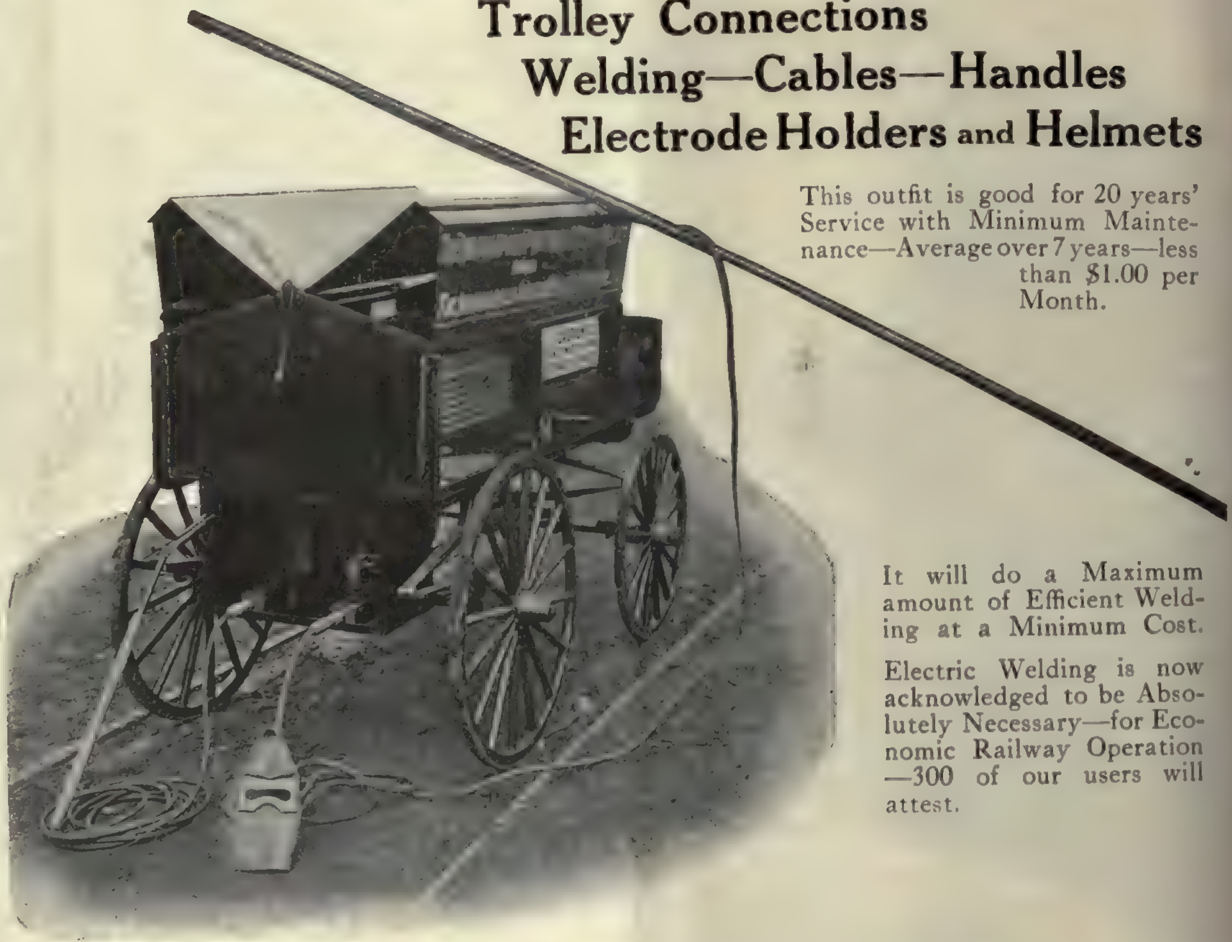
# $500.00 Pay-as-you-Save

Will equip your road with an

## Indianapolis Patented Portable Electric Welder

Complete—ready to operate—including

**Trolley Connections**
**Welding—Cables—Handles**
**Electrode Holders and Helmets**



This outfit is good for 20 years' Service with Minimum Maintenance—Average over 7 years—less than $1.00 per Month.

It will do a Maximum amount of Efficient Welding at a Minimum Cost.

Electric Welding is now acknowledged to be Absolutely Necessary—for Economic Railway Operation—300 of our users will attest.

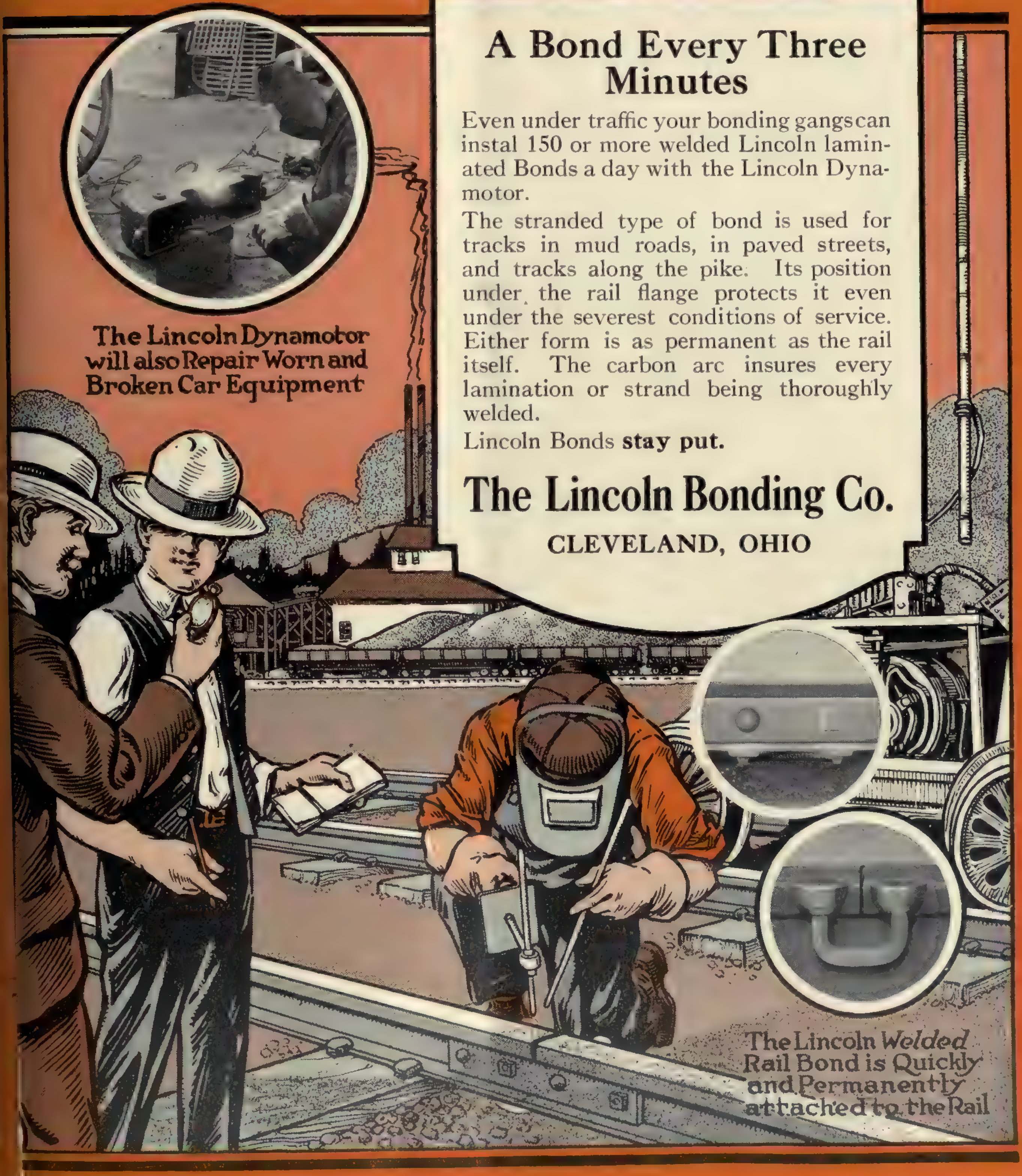
***Get our Book on Welding—Joints—Reclaiming Track Special Work and Rolling Stock Equipment***

## Indianapolis Switch & Frog Co.

Springfield, Ohio

# Lincoln Dynamotor

## Portable Bonder and Welder



The Lincoln Dynamotor will also Repair Worn and Broken Car Equipment

The Lincoln *Welded* Rail Bond is Quickly and Permanently attached to the Rail

### A Bond Every Three Minutes

Even under traffic your bonding gangs can instal 150 or more welded Lincoln laminated Bonds a day with the Lincoln Dynamotor.

The stranded type of bond is used for tracks in mud roads, in paved streets, and tracks along the pike. Its position under the rail flange protects it even under the severest conditions of service. Either form is as permanent as the rail itself. The carbon arc insures every lamination or strand being thoroughly welded.

Lincoln Bonds **stay put.**

**The Lincoln Bonding Co.**

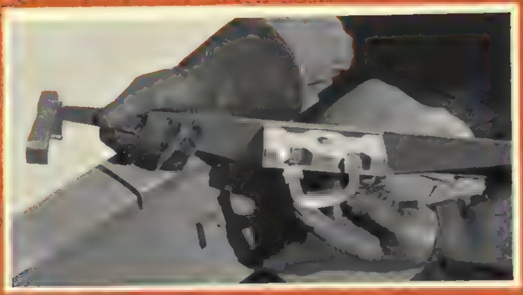
CLEVELAND, OHIO

OVER

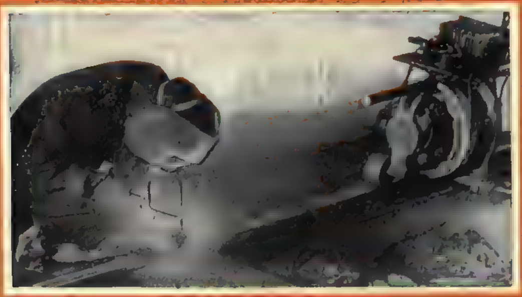
# Bonding under 3-Minute Schedule

## WITH THE LINCOLN DYNAMOTOR

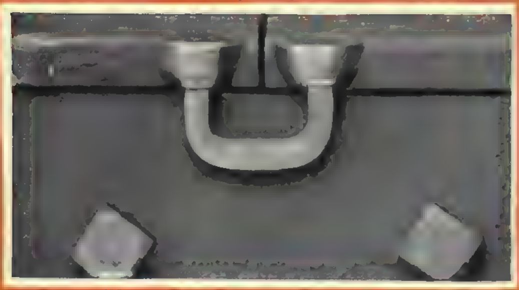
So short is the time required for welding a Lincoln Bond to the rail that any traffic schedule is entirely practicable. These photos show the method of installation.



**Car Has Just Passed.** The helper fits the clamp which holds the carbon mold containing the Lincoln Bond in place on the rail.

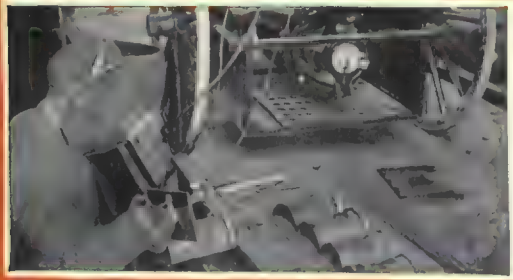


**45 Seconds Later.** The welding operator has welded the bond solidly to the rail by means of the carbon arc by the Lincoln Dynamotor. The carbon mold retains the molten metal thus building up the head of the bond and welding it to the rail.



**The Bond is Now Installed.** It only remains to remove the clamp from the rail and the trolley pole from the wire and the track is cleared.

Let us speed up your bonding. Write us today for a demonstration of the Lincoln Dynamotor and Lincoln Bonds.



Not only does the Lincoln Dynamotor give you a perfectly continuous and permanently bonded track, but it is a motor-generator arc welding set in one which will repair worn or broken frogs, crossovers and turnout points, and reclaim 90% of the damaged car and shop equipment you are now scrapping.

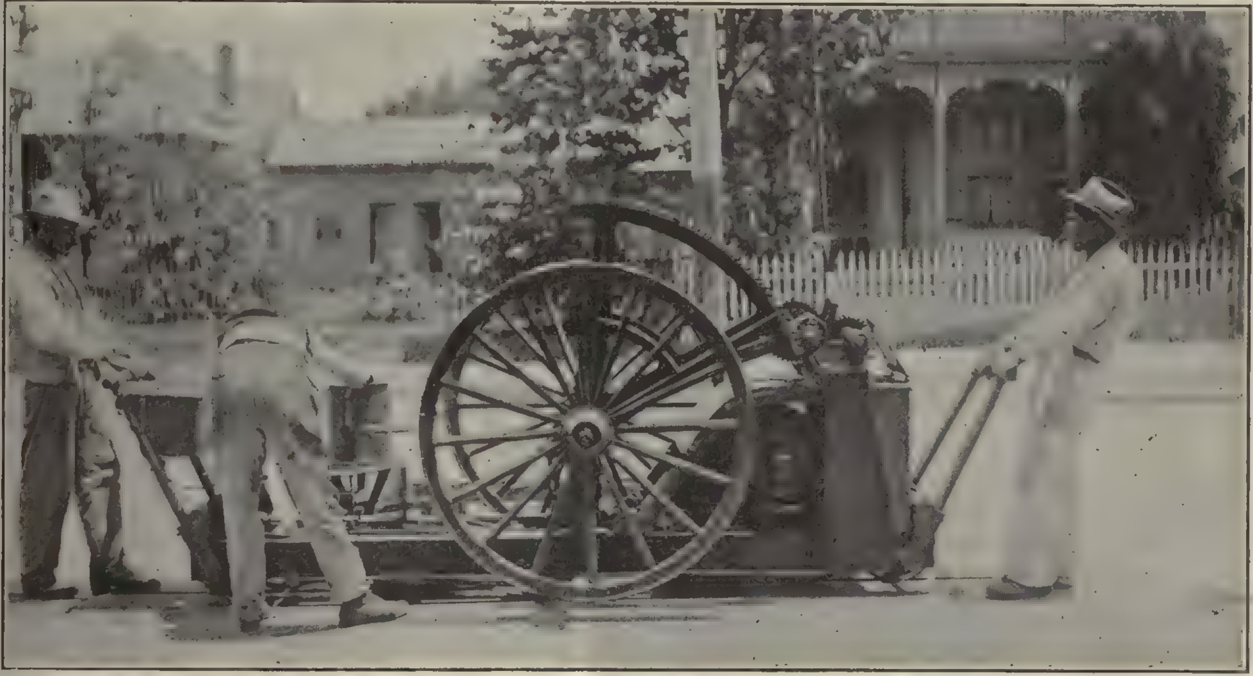
## The Lincoln Bonding Co., :: 636 Huron Road Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City.
LINCOLN BONDING CO., - - - Fisher Building, Chicago, Ill.
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia, Pa.
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building Pittsburgh, Penn.

CHATTANOOGA ARMATURE WORKS, - - Chattanooga, Tenn.
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.
BURTON R. STARR COMPANY, - - Yesler Way, Seattle, Wash.
A. A. WIGMORE, 441 Pacific Elec. Bldg., - - Los Angeles, Calif.
CHARLES N. WOOD COMPANY, 14 Federal Street, Boston, Mass.

# Two Savings—

**15 to 40 per cent increase in life of track** + **Saving in cost of repairs**



# Reciprocating Track Grinders

are heaping up savings for scores of electric railways throughout the country.

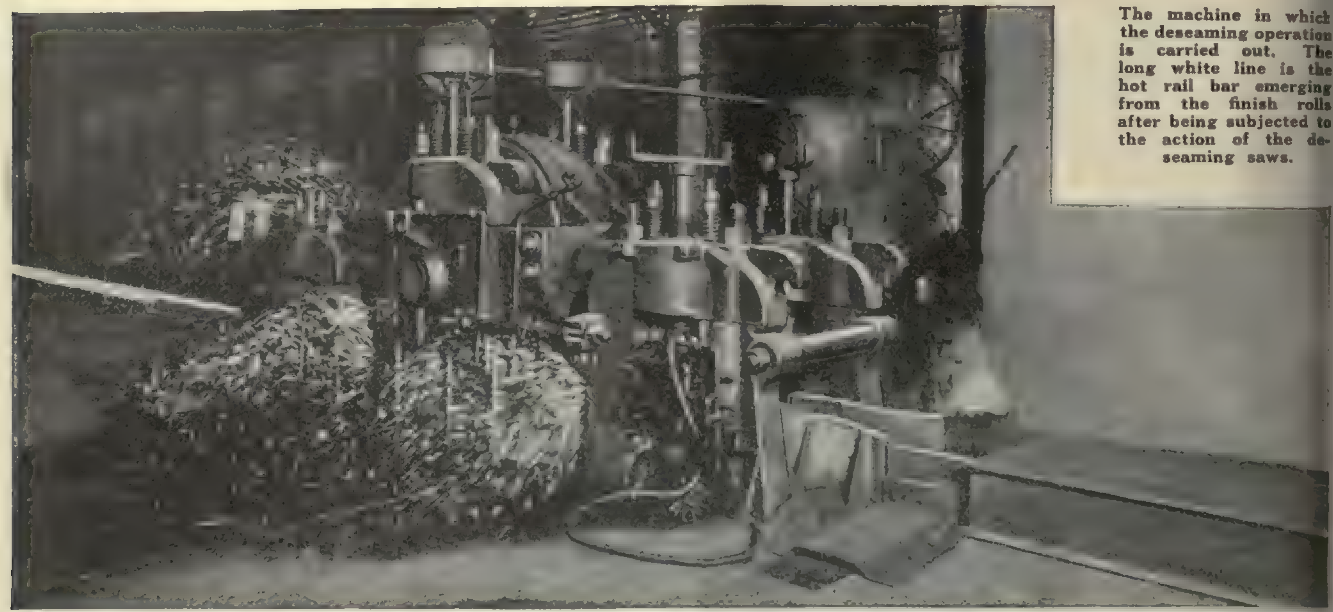
Rails will last almost twice as long if they are properly cared for *from the time of installation.* Immediately after laying they should be ground to a perfect condition of smoothness at the joints to prevent disastrous "cuppings," and corrugations must be ground out *as they appear.*

Reciprocating Track Grinders answer the demand of every condition. They do the work efficiently, cheaply and thoroughly. The savings of one will soon pay for another.

***Let it sell itself on your own track.***
***If not satisfactory, return to us without obligation.***

## RAILWAY TRACK-WORK COMPANY

**30th and Walnut Streets, Philadelphia**



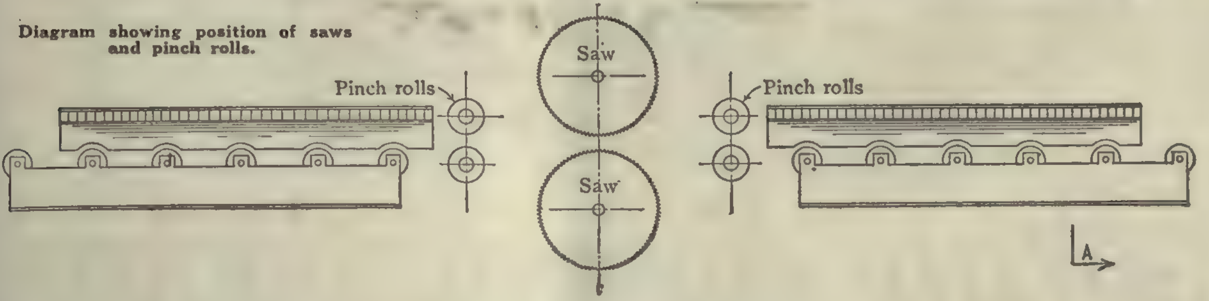
The machine in which the deseaming operation is carried out. The long white line is the hot rail bar emerging from the finish rolls after being subjected to the action of the deseaming saws.

# This is the Lackawanna Deseaming Machine, which cuts off the weak metal that ruins running surface and starts cracks in rails made in the ordinary way.

Our previous two-page advertisements have made plain the necessity for removing the weak, laminated, partially decarburized metal at the head and base of rails, in order to secure a harder, longer-lived running surface and a greater safety from cracking and fracture. This announcement will explain how the desired metal improvement is accomplished in the Lackawanna Process.

The machine by which the weak metal at the location of the rail head and base is removed subjects the hot rail bar on top and bottom surfaces to cutting action from teeth on two opposed rotating saw discs, just after the hot bar comes down the mill table from the last roughing pass. During this stage of travel a collar roll turns the rail bar so that its head is down and the base up. The bar then enters a tunnel about 20 feet long and lined with fire brick to check heat radiation. (See diagram on opposite page.) It is then forced between the saw discs by a pair of driven pinch rolls, adjustable to bars of various sizes and having guides for the top, bottom and sides of the bar. Adjustment of the saws is made for a cut ⅛ inch or at the extreme 3/16 inch deep. A second set of driven pinch rolls, on the delivery side, helps to force the bar against the cut of the saw teeth and similarly a second set of guides here helps to hold the bar rigidly and firmly during passage through the saw. From the delivery set of pinch rolls the bar travels through about 40 feet more of tunnel similar to that on the

Upper saw disc taken from the machine.



ntering side and then goes on its way to the stand of finishing olls. The hot bar enters the saw at a speed of about 350 feet er minute, is slowed down by the cutting operation to about 9 feet per minute, and on leaving the saw rapidly picks up peed until it enters the finishing stand, at about 500 feet per inute.

The upper saw disc (operating on the base of the bar) has an 8-in. and the ower (operating on the head) a 6-in. face. Both are driven from belted motors, re 5 ft. in diameter and run at a peripheral speed of 25,000 ft. per minute, r, in other words, both discs together make 800,000 tooth contacts with the ar per minute. The capacity of the machine is 170 tons of rails per hour.

All Lackawanna Rails of 50 pounds per yard and heavier are now deseamed y this process, which in connection with high chemical purity makes the Lackavanna product unquestionably superior to any rails that have ever been offered.

Watch for our following announcements which will give interesting data n rail performance, and send for our book "The Lackawanna Deseaming rocess."

Showing the position in which the partially finished rail bar travels between the saws, and the extent to which soft metal is removed at the head and base.

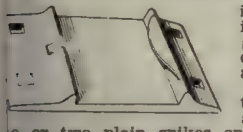
# All Lackawanna Rails Are Deseamed

## Other Lackawanna Aids to Better Track

### The Lackawanna Safety-Head Angle Bar

overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle oar for a short space at the center where the rail ends meet.

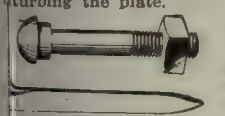
### The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

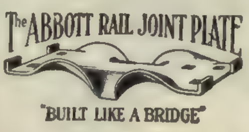
Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. e or two plain spikes on the plain rib complete the bond between ate and both rail flanges. The plate is fastened to the tie by indendent plain or screw spikes. The rail may be removed without turbing the plate.

### Lackawanna Track Bolts and Spikes



Our track bolts and spikes of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

### The Abott Rail-Joint Plate


The ABBOTT RAIL JOINT PLATE
"BUILT LIKE A BRIDGE"

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars, and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service for use in paved streets and for welding to the rail base and may be held with either screw or ordinary spikes.

**Write for our booklet**
**"Improved Track Appliances"**

# Lackawanna Steel Company

**General Sales Office and Works: Lackawanna, N. Y.**

lanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

418

# SPEED

## "Blaw" Speedster Buckets

*Always live up to their name & rating.*

Picking up an overload at every bite, coupled with its speed in operation, this 1½ cu.yd. "BLAW" SPEEDSTER is giving excellent service at the plant of the Northwestern Consolidated Milling Co., Minneapolis, Minn., where the fast rehandling of loose bulk materials is an essential factor.

Your plant would also benefit by the installation of a "BLAW" Bucket. Inform us of your requirements, and our engineers will help solve your problems.

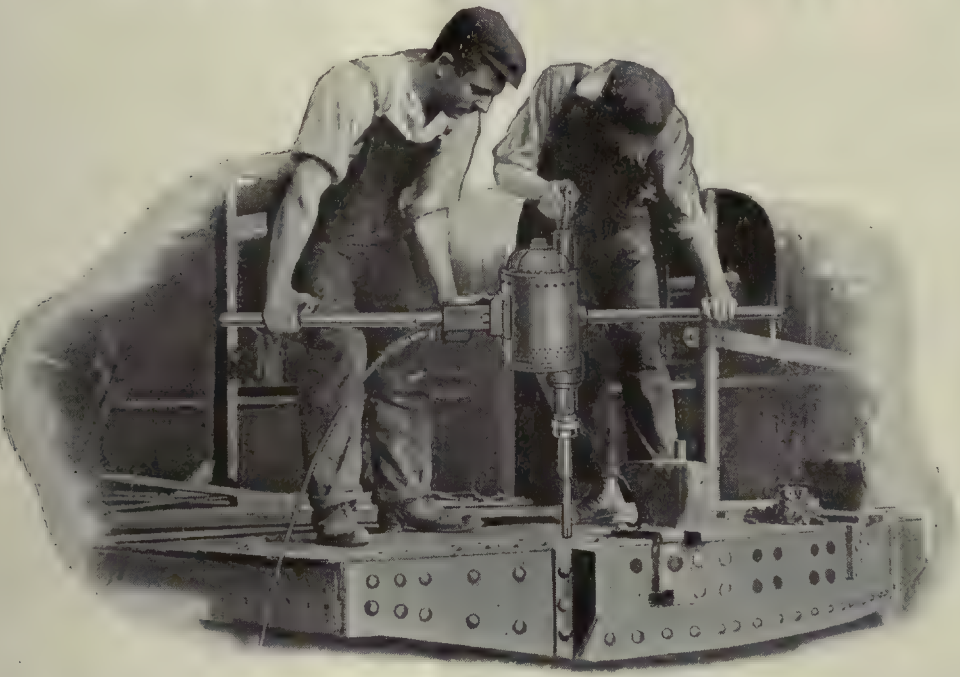
**BLAW-KNOX COMPANY**
**605 Farmers Bank Bldg., Pittsburgh, Pa.**

New York, 165 Broadway
Chicago, Peoples Gas Bldg.
San Francisco, 630 Monadnock Bldg
Foreign Sales Representatives
Gaston, Williams & Wigmore, Inc.
39 Broadway,
New York City

PRODUCTS
BLAW FORMS
BLAW BUCKETS
FABRICATED STEEL
TRANSMISSION TOWERS
FURNACE EQUIPMENT
BLAW MIXERS
PLATE WORK

# LITTLE GIANT

## Portable Electric Tools



## *Does your shop use Portable Electric Tools?*

POWERFUL, speedy, vibrationless, dependable — and equipped with the most ruggedly built electric motors to be found in any line of portable electric Tools made!

That's what users say about Little Giant Portable Electric Drills (and Grinders too).

Little Giant Electric Tools incorporate features of construction the result of twenty-five years experience. Judge their superiority on your work by actual test. Test them for efficiency, pulling power, and low temperature rise; test them for drilling speed, operating economy and ease of control, maintenance and inspection.

Then, with the figures at hand, remember your decision to standardize on "Little Giants" will be substantiated by the fact that they are by far the most extensively sold and used line of portable electric tools in the world!

Made in a complete line for A. C., D. C., or Universal service.

*Do you have the new bulletins?*

Chicago Pneumatic Tool Company
1062 Fisher Building, Chicago, Illinois
*Branches all over the world*

**"Chicago Pneumatic" Products**

- Pneumatic Tools
- Electric Drills
- Air Compressors
- Oil, Gas and Steam Engines
- Vacuum Pumps
- Rock Drills

CL-4

**"CHICAGO PNEUMATIC"**

*Depend upon that name*

# How Thermit Insert Welds make rails jointless

## 6. "In this picture, the molten thermit steel is running into the mold!"

"In about 30 seconds after the crucible contents are ignited we tap it at the bottom and allow the steel to run into the mold.

"The steel enters the mold on the lip side of the rail and thoroughly melts and amalgamates with the lip as well as the web, base and one side of the head.

"When the metal begins to cool, it produces sufficient pressure on the insert to thoroughly butt weld it into position and the two rail ends become one **homogeneous rail.**

"But wait till you see the results. In the next picture we remove the mold boxes."

**See these movies on your office wall!**

*We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.*

**Metal & Thermit Corp.**
**120 Broadway, New York**

BRANCHES
329-333 Folsom St., San Francisco.
15 Emily St., Toronto, Ont.
7300 So. Chicago Ave., Chicago.
1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.

**The Ten Steps**

1—Placing the Insert
2—The Sand Molds
3—Clamping the Molds
4—Preheating
5—Filling the Crucible
6—Pouring the Steel
7—Removing the Molds
8—Grinding the Weld
9—Maintaining Traffic
10—Inspection trip

# twelve years ago—

these 36-inch **ARMCO IRON** Culverts were placed in this little stream. Through every extreme of heat and cold that twelve summers and winters have brought, they have stood up staunch and sturdy, unaffected by rust, showing no sign of deterioration.

Installations such as this, made years ago in all parts of the country, have established the fact that **ARMCO IRON** Culverts are permanent improvements.

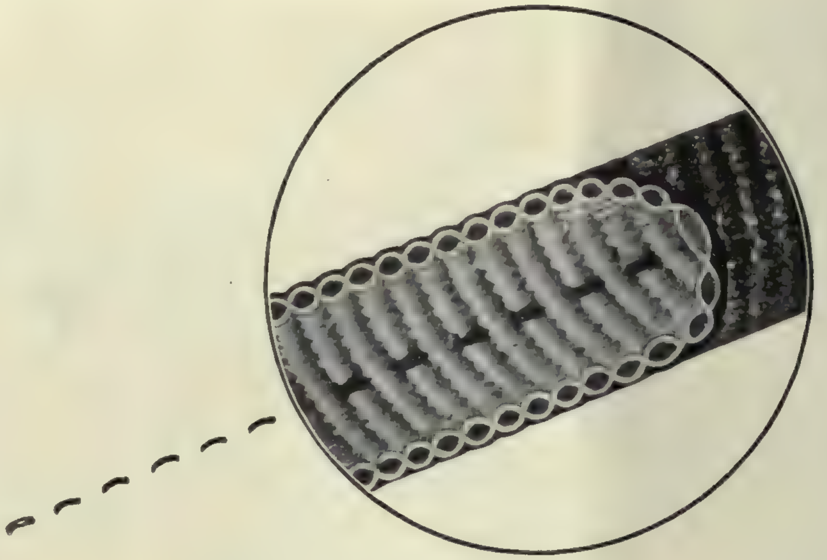
AMERICAN ARMCO INGOT IRON

LOOK FOR THE TRIANGLE TRADE MARK

There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**

**TRANSPORTATION BLDG. CHICAGO**



# Be sure it's

# DURADUCT

(Reg. U. S. Patent Office)

# before you go ahead

**In order that you may easily identify Duraduct, we weave a black thread along the white interior "roller bearing" wire way.**

**This is your guarantee that you are getting the best.**

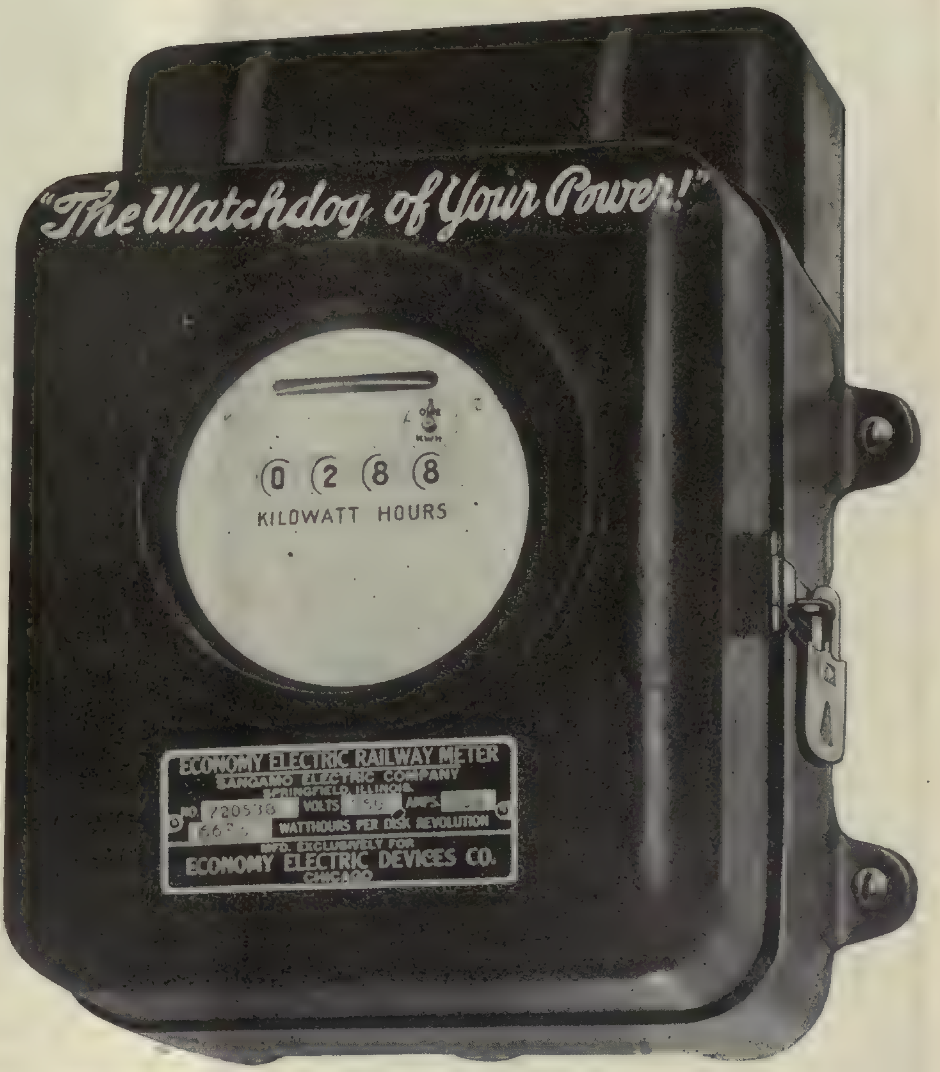
**All good jobbers sell Duraduct.**

TUBULAR WOVEN FABRIC COMPANY
MANUFACTURERS · PAWTUCKET · R. I.
A. HALL BERRY · GENERAL SALES AGENT
71-73 Murray Street, New York 9 So. Clinton Street, Chicago
WENDELL & MAC DUFFIE CO., 61 Broadway, New York City
Distributors for all foreign countries except Canada
*Northern Electric Company,* LIMITED Distributors for Canada

THE BLACK DOTTED LINE IS THE MARK OF
DURADUCT

# SCRANTON INSTALLS

## Economy Railway Meters


"The Watchdog of Your Power!"
0 2 8 8
KILOWATT HOURS
KWH
ECONOMY ELECTRIC RAILWAY METER
SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS
NO.
VOLTS
AMPS.
WATTHOURS PER DISK REVOLUTION
MFD. EXCLUSIVELY FOR
ECONOMY ELECTRIC DEVICES CO.
CHICAGO

**They meter the**
***ENERGY***
**and that's what**
**the management**
**wants to save**

The Scranton Railway Co. is equipping all its cars with Sangamo Economy Meters.

This was done after full consideration of the excellent results obtained by another American Railways property, the Chicago & Joliet Electric Ry. This property has been operating *Economy Meters* for several years and is, in fact, one of the pioneers in the adoption of this power-saving device.

The dial of the ECONOMY Meter shows the motorman just how much energy he uses.

He knows that by saving energy he saves money and few men are wilfully wasteful.

Because the ECONOMY Meter measures what he is trying to save, the motorman can satisfy himself as to the most economical methods of operation.

His interest is held and he does save.

These fundamentals underlie the success of the ECONOMY Meter.

This device on your cars will speedily pay for itself in the savings it effects.

***Let us send you our illustrated booklet describing it.***

## Economy Electric Devices Company

**General Sales Agent**

**Sangamo Economy Railway Meter**

**Old Colony Bldg., Chicago**

National Railway Appliance Co., New York
Burton R. Stare Co., Seattle
Ludwig Hommel & Co., Pittsburgh
L. A. Nott, San Francisco
J. G. Monahan, Los Angeles

V. V. FITTINGS

FOR CARS, STATIONS, REPAIR SHOPS AND BARNS

*For the Electric Railway Service*

V. V. Fittings and V. V. Safety Switches fill every conduit wiring need in Maintainence Shops, Stations, Car Barns and Cars. They help to insure perfect and continuous service in addition to minimizing repairs and maintainence.

The V. V. Line is complete in variety and with their interchangeable features they will help you save and reduce your stock requirements.

Our Catalog No. 21, covering the complete listing of V. V. Fittings and V. V. Safety Switches, is yours for the asking. Write today—

WE ARE AT YOUR SERVICE

Get V. V.'s into your Car Specifications

CONDUIT ·V·V· FITTINGS

V. V. FITTINGS COMPANY
MAIN OFFICE AND WORKS
PHILADELPHIA PA. U.S.A.
BRANCH OFFICES
NEW YORK CHICAGO

# 7 Reasons

## why you should choose

# Arthur Power-Saving Recorders

"He can check it with his own watch"

First—Because it talks the language of the motorman. It measures the power-on time—and (note this for it is important) it measures it in terms that the motorman understands—minutes. If you want to save power, encourage the motorman to shut it off by recording the minutes he has the power on.

Second—It encourages legitimate coasting without holding off the brakes until the last second each time.

It encourages the motorman to run with the power shut off—the natural way to save power and also the safest method of operation.

Third—The motorman has faith in the Arthur Recorder for the reason that he understands it easily. If necessary he can check it up with his own watch at any time. Because of this his cooperation is more easily obtained and better power-saving results are produced than where the motorman is more or less working in the dark.

Fourth—It requires but little clerical work to follow up the records.

Fifth—Where desired its figures can be used as a basis for arriving at car inspection intervals, so doing away with the cost of obtaining individual car mileages. Cars can be inspected on a "service" rather than on a mileage or daily basis.

Sixth—Since it costs comparatively little and saves a great deal, it follows that it will pay for itself on any property in a very short time.

Seventh—You don't have to buy Arthur Recorders. If desired we rent them on easy terms and allow the full amount of the rental payments to apply on the purchase price.

The advantages of Arthur Recorders are substantiated by the solidest kind of facts, by hard cash saved on large scale properties.

*"It Talks the Language of the Motorman."*

**The Arthur
Power-Saving Recorder Co.**
**New Haven, Conn.**

# "D & W" RENEWABLE FUSES

## The New "Jacketed" Expulsion Link is the Greatest Improvement since the Renewable Element was Introduced

The new "Jacketed Expulsion Link" consists of a flat strip of special alloy metal with the central portion enclosed by a jacket of specially treated asbestos which is unaffected by high temperature.

This "Jacketed" Link, by its explusion action, greatly reduces the arc and insures longer life to the fuse casing.

"D & W" Renewable Fuses with the "Jacketed" Links will meet the extreme short circuit tests imposed by the Underwriters' Laboratories, Inc., which subject *one fuse at a time* to full rated voltage at 10,000 amperes.

*For Complete Description send for the Supplement to Catalog No. 16.*

**The only advantage of a renewable fuse is the number of times it can be reloaded. Try the "D & W."**

D & W Fuse Company
Providence R.I.
U.S.A.

REG. U.S. PAT. OFF.

**CAR COSTS**
**EARNINGS**
***25c. per car mile***
**Platform Expenses**
***90c. per car hour***

**CAR COSTS**
**EARNINGS**
***25c. per car mile***
**Platform Expenses**
***50c. per car hour***

# The Way Out

"We're not short of cars, but we simply can't afford to run them at a platform cost of 90 cents an hour when we are earning only 25 to 30 cents a car mile."

"Could you afford to run them at 50 cents an hour?"

"Oh help, yes. But how can we get men to work at that rate now?"

"You can't get *men* but can get *A Man* for that rate. Just

"Put National Pneumatic Door and Step Control

# On Your Laid-Up Cars

"And you will be surprised at the way both your traffic and your former employees will be glad to come back."

**NATIONAL PNEUMATIC COMPANY**
INC.

**50 Church St., New York** **Edison Bldg., Chicago**

**Works: Rahway, N. J.**

# STOCO "CELOGLAS"

## SHATTER-PROOF LENS

# SAFETY GOGGLES

Every principle of good eye protection is found in the Stoco Safety Goggle with "Celoglas" shatter-proof lenses—comfort and adequate protection.

"Celogas" lenses are the greatest eye protection devices of the age. They will withstand tremendous blows from missiles of all descriptions without leaving the goggle frame and, even though they may fracture under some conditions, no glass will fly into the wearer's eyes.

The frames for Stoco Safety Goggles are a perfect combination of strength and comfort. Your men will wear them with a sense of security. Made with easy cable temples, as illustrated, or with elastic headbands.

Any safety engineer or superintendent will be sent a 'Celoglas" lens without charge. Test it with a hammer or any other weight. It will not shatter.

STANDARD OPTICAL Co
GENEVA, N.Y.

# The "Jumping-Off Place" to the Gold Fields

Kansas City was that in '49 and the early fifties because it was then the last completely equipped outpost of commerce west of the Mississippi.

To the men of that generation Kansas City was a busy center of commerce and from that day to this it has been a "starter" of many things for the greater service of the people of the Middle West.

It was one of the first cities in this country to develop and put into service the idea of a "Union" station for all the railways entering its gates.

The picture shows that early union terminal as it appeared forty years ago. Kansas City was the first community equipped with the overhead trolley system for street railways.

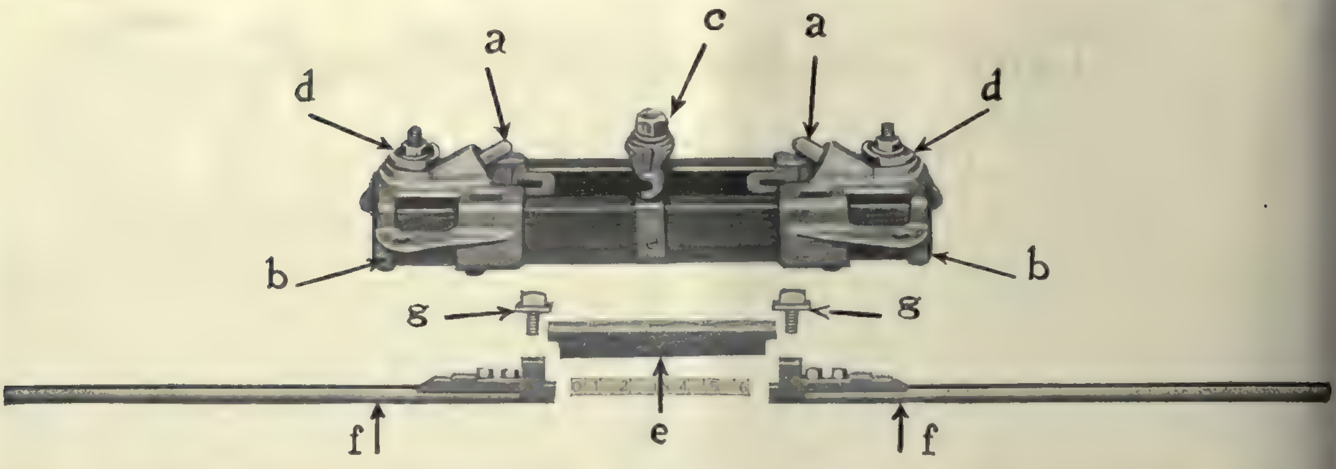
The impetus which rapid transit gave the city's growth was quickly appreciated and other communities throughout the country rapidly developed the same methods.

## Galena Oils *and* Galena Service

gave an impetus to the art and science of lubrication that has enabled that art to keep in step with the constantly growing and changing needs of the railway industry, and have always retained their positions in the forefront of the lubricating industry.

## Galena-Signal Oil Co.

Franklin, Pa.



# Ten good features make the G-E Form L4 section insulator the right one for your road

1. The body is permanently wired into the overhead but all wearing parts can be easily and quickly renewed at less than 15% of the cost of a new insulator.
2. Sturdy steel wedges (aa) hold the trolley wire with a grip more powerful than the wire itself.
3. Strain eyes (bb) are provided in the castings for anchor wires.
4. The span holder (c) is adjustable to any position of the span wire.
5. The side bars are of impregnated hard wood.
6. Each end casting is equipped with a feeder clamp (dd).
7. The 7-in. hard wood runway (e) is renewable.
8. Eighteen-inch renewable flexible approaches (ff) fit around the trolley wire closely and protect it from wear.
9. Two stud bolts (gg) secure all wearing parts to the body.
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## G-E LINE MATERIAL

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**General Electric Company**

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# Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

olume 53 New York, Saturday, June 21, 1919 *Number* 25

## he Last Call for Dinner

IT WAS a momentous investigation that began in New York on Thursday morning when the new Federal Electric Railways Commission held its first hearng. Practically every other course to secure jusice for the electric railway companies of the counry was tried before the President appointed this special ommission. But although the essential nature of the roperties to community development has been generally ecognized and the injustice of compelling the companies to give this service at less than cost because of var conditions has been universally admitted, relief neasures have been refused in many cities. Where the ailway companies appealed for bread in the form of igher fares and reduced taxation, they have received stone, and in consequence some fifty street railways re in the hands of receivers.

Now the last call for dinner has sounded. The federal uthorities, with their wider view of the situation, have ppointed a commission to investigate the entire subect, and this commission is now sitting. The fact hat the President of the United States has thus acted ught to call forth the best efforts of every man in ne electric railway industry. The constructive factors f the United States, particularly with relation to the lectric railway industry of the country, ought to come orth in support of the President. The men in the ndustry ought to suggest remedies for all the things hat they think are wrong. They know better than anyne else what is happening to the electric railways, and is their duty now to help in recommending a solution. he burden of representing the electric railway inerests in this investigation will naturally fall largely n the American Electric Railway Association and its ommittee of one hundred, and they should receive earty support.

There have been so many important questions relating the technical and engineering phases of the electric ailway industry during the past thirty years that ndamental questions in connection with the earning ower of these properties have been largely ignored. he consequence is that many railways which have been mpletely reconstructed several times during the past ecades are operating under charters granted during orse-car days. The existing hearings should result in a condition which will be fair and liberal both to the investor and labor, and now is the time to get these fundamental conditions changed. By this we mean that in the future it ought to be impossible for a well managed public utility in a growing and prosperous city to be in a position where it cannot recompense both its investors and its employees adequately. Both men and owners should be paid on a parity with the conditions in other industries, with due regard, in the first case, to the skill exercised, and in the second case, to the hazards run.

## The Constant-Speed Motor in Heavy Electric Traction

THE commutatorless induction motor has been considered, since its inception, a desirable source of motive power for heavy electrification, but the necessity for using two contact conductors opposed an effective barrier to its progress until within a few years. To be sure this type of motor was used abroad on the Valtellina line of the Italian State Railways, in the Simplon tunnel and elsewhere, but for years the Cascade tunnel electrification of the Great Northern Railway in Washington was the only example of a polyphase-motor-equipped road in this country. Some operating data and a brief review of the equipping of this tunnel zone by the Great Northern's electrical engineer are given elsewhere in this issue. Attention is directed especially to the striking evidence of the power of the motors furnished by an instance in which the drivers of one of the locomotives cut deep into the rails. Mr. Marshall's article is of particular interest because little has been heard of this electrification since all four of the locomotives comprising it were overturned by an avalanche of snow in 1910.

About four years ago the Norfolk & Western Railway began operation of its electric zone in the West Virginia mountains with a novel modification of the type of locomotive used in Washington, but in which only one overhead conductor was employed. Power received in single-phase form at the locomotive is transformed in an induction-type phase converter to three-phase form for use in the driving motors. The result has been a combination of the virtues of the single- phase and polyphase systems. The next step, now in process of being taken, was characterized by the Pennsylvania Railroad's exhibit at the Atlantic City convention of the past few days. This road has inaugurated a study of the qualities of the phase-converter locomotive for use on its Altoona division. As the Pennsylvania is a heavy stockholder in the N. & W. this step is logical and commendatory of the results secured further south. The division for which this type of locomotive is proposed is one containing heavy grades through the Allegheny Mountains. The general features of the experimental locomotive exhibited are similar to those of the N. & W. machine, but a synchronous rather than an induction type of converter is used with a view to improving the power factor.

Some of the advantages of the constant-speed locomotive were given in last week's issue in an article by A. H. Babcock, consulting engineer Southern Pacific Railroad. Those inherent qualities which appeal to us most forcefully are the simplicity and ruggedness of the polyphase motor, its adaptability to power regeneration and the ease with which a high power factor at the motor can be secured.

## Some Non-Spectacular But Useful Electric Zones on Steam Roads

THE reference in the preceding editorial to the Great Northern electrification suggests a word of appreciation for several short sections of large railroad systems on which electric operation has been doing its special work on a small scale for years. So smoothly and unostentatiously do these function that they are largely forgotten. For example, take the pioneer Baltimore & Ohio tunnel zone in Baltimore, Md., now rounding out its quarter century. This blazed the way for the application of direct current in many other quarters. Then there is that largely-forgotten single-phase spur of the Erie at Rochester, N. Y., where plans were tried out that later were expanded on the New Haven and other roads, most lately on the Chestnut Hill branch of the Pennsylvania at Philadelphia. Of the same type and also quite early were the Sarnia tunnel section of the Grand Trunk and the Hoosac tunnel section of the Boston & Maine. And the direct current zone of the Michigan Central under the Detroit River must not be overlooked, either.

The above are but a few of the instances where electric operation has so long been a matter of course that attention is no longer paid to it. These installations, however, have furnished and are furnishing the data which will become invaluable as the merits of electric operation are better and better appreciatd. We by no means claim that the problems in this field are all solved or that the positions of the men in charge of the operation of present electrified zones and divisions are sinecures. We aver, however, that the electric locomotive is no longer an experiment, and that its present rate of metamorphosis is no more rapid than a live art warrants.

## The One-Man Car Is Its Own Skip Stop

DURING our period of big-car development we have strayed a long way from the true purpose of a street railway, to wit, to keep the people from walking. In the day of the bobtail horse car that purpose was in at least one sense carried out better than now because it was possible to stop the car just where the customers wanted it without any annoyance to fellow-passengers. As cars became bigger, the passenger was asked to walk to a corner in boarding a car and from a corner in leaving it. More recently, it has been found that the stops must be still further apart if economical operation, good speed and pleasant riding for all passengers are to be efficiently attained. Thus we reached the point where a man who rode say one mile might have to walk a goodly fraction thereof along the route because he was not taken on and let off at exactly the places most convenient for himself. Now to start a person's pedals going is dangerous business for the street railway, and it is still more dangerous if no car is in sight when he reaches a stop sign. Unless he is going a distance unprofitably long for the railway, he is likely to keep moving and spend his money for something else.

Here is just the point where the modern one-man car combines the personal service feature of the bobtail vehicle and the higher running speed of its electrical successor. The one-man car does not have to stop precisely at one's doorstep, but it can come closer than the big car toward this ideal because inherently it has a smaller number of stops per mile. For instance, to keep the number of stops of a fifty-passenger car down to six, we must permit it to stop only at six specified stopping places within a mile. But this arbitrary arrangement is not necessary with a thirty-five-passenger one-man car, for, other conditions being equal, it will not have to stop more than six times per mile in any event to make stops at the crossing most satisfactory to each passenger. Thus, as we said as early as June 22, 1918, the smaller car actually embodies the skip-stop principle so far as the features of passenger convenience and free running speed are concerned.

We do not ignore the fact that the total number of stops for all cars will be greater in the case of one-man car operation. However, the cost of the extra stops with 15,000-lb. cars is a less fearsome proposition than with 30,000 to 40,000-lb. cars. It seems odd that cars should have grown so heavy that it was almost cheaper to skip a single passenger than to stop for him! The return to the small, one-man car with its optional-stop, frequent-service possibilities is a return to a saner viewpoint of the true function of a street railway. Hence, the "Don't let em' walk" principle of the one-man car is not a negation of the general skip-stop idea.

## The Daylight-Saving Law in Danger

THERE is a determined effort on the part of a considerable number of our countrymen to have Congress "call off" the summer practice of turning the clock hands forward *pro tempore* each spring. This effort is to be regretted as it is apparently due to a desire to put individual preference above the common good. The electric railway industry can look at this matter in an unprejudiced way, being affected very little as far as the transportation end of the business is concerned. Those who do lighting as a side line undoubtedly lose some patronage, but the extra daylight hour at the end of the day probably brings in some additional transportation revenue from those who use the cars then to get out into the country or to the parks for recreation. But, to speak broadly, it is in the general interest of conservation to utilize to the full the hours of daylight, as Benjamin Franklin sagely observed when he was ambassador at the French court. If our readers agree with this they will take no offense at the suggestion that they utilize their company publications and other publicity mediums in supporting the daylight-saving movement, explaining clearly at the same time, to quote Franklin again, that they have "no axe to grind."

## Comments on the Detroit Wage Settlement

AGAIN a contract has been discarded and an award of the War Labor Board set at naught. Developments in Detroit during the past week have shown that an agreement on the part of union labor, to abide by such an award is sacred only while it is in favor of the employee. Had the management of the company rejected the decree because it was unsatisfactory or too burdensome—as such a decree usually is—there would have been no end to criticism on the part of the public. The many companies which were affected by these awards accepted the additional expense although it meant another step toward bankruptcy, knowing that even the proclamation of peace is not likely to lead to a reduction in this item of expense.

The setting up of a 60-cent maximum wage in Detroit holds a threatening aspect for properties in other large cities. This rate may have been justified by the high cost of living in that city and the company probably had to pay it because of the scarcity of labor and the appeals for help from competitive industries. However, inasmuch as the War Labor Board saw fit to put other cities in the same class with Detroit in fixing a wage standard this conclusion is not likely to be overlooked by organized labor when wages are up for readjustment elsewhere. In our issue of Jan. 18 we pointed out the injustice which was likely to result from this attempt to fix a standard wage, and we believe that recent developments have helped to accentuate our criticism.

Cost of living may be unusually high in one city and lower in another community. The railway company in the former place may be exceptionally prosperous (if such an expression can be used even in a comparative sense) while in the other city it may be facing a receivership. On the War Labor Board's theory the same wage scale would be fair for both companies. We cannot see any justification for this, and we contend that each company should have an opportunity to prove the cost of living and the situation as to labor supply in its own community.

It was probably more than a coincidence that the platform employees of the Cleveland company should have presented their demands for a 60-cent maximum wage on the same day that the Detroit settlement was made. These men, like those in Detroit, were bound by the federal board's ruling until the end of the war, but they insisted that the wages established last August were no longer adequate. The company has replied that it cannot grant the increase unless the franchise is amended to remove the fare limit which was recently xed. Here again we find a situation which might set an unfair precedent for other cities of the 48-cent wage class, because the Cleveland company may be able to get a higher rate of fare while others on whom imilar demands are made may be less successful.

One fortunate development may come from these wage disputes. In Detroit the people were impressed as never before with the company's need for additional revenue and a slight increase in fares was granted, although it had been refused several times before. The public seem to need such crises to impress them with the merits of the utilities' petitions for relief. Perhaps they will see a justification also in the request of the Cleveland company both for a higher fare and an increased dividend for stockholders. President Stanley argues that the purchasing power of a dollar has depreciated to such an extent that a 6 per cent return is no longer adequate and that the widows and orphans who depend on such dividends for a living are entitled to the same consideration as the men who operate the cars. The day may be at hand when the investor as well as the employee is to get a living wage. In that case, there may be a silver lining to these clouds.

## House Paint or Attractive Finish for Cars?

MOST of us recall the gaudy coloring and elaborate gold leafing and striping of the old-time horse car. As the railway lines were consolidated and electrified, simplicity and uniformity became the rule almost to the point of obliterating the car number and the company's monogram or symbol. In more recent times, the statement has been made that a car is simply a house on wheels and deserves no more attractive finish.

We do not intend to advocate the restoration of the filigree school of car painting nor the long-drawn-out painting schedules that were characteristic of the time. What we do question is whether it is wise to attempt to save a few dollars on paint, varnish or enamel, if thereby a company loses the ride-pulling value of attractive rolling stock.

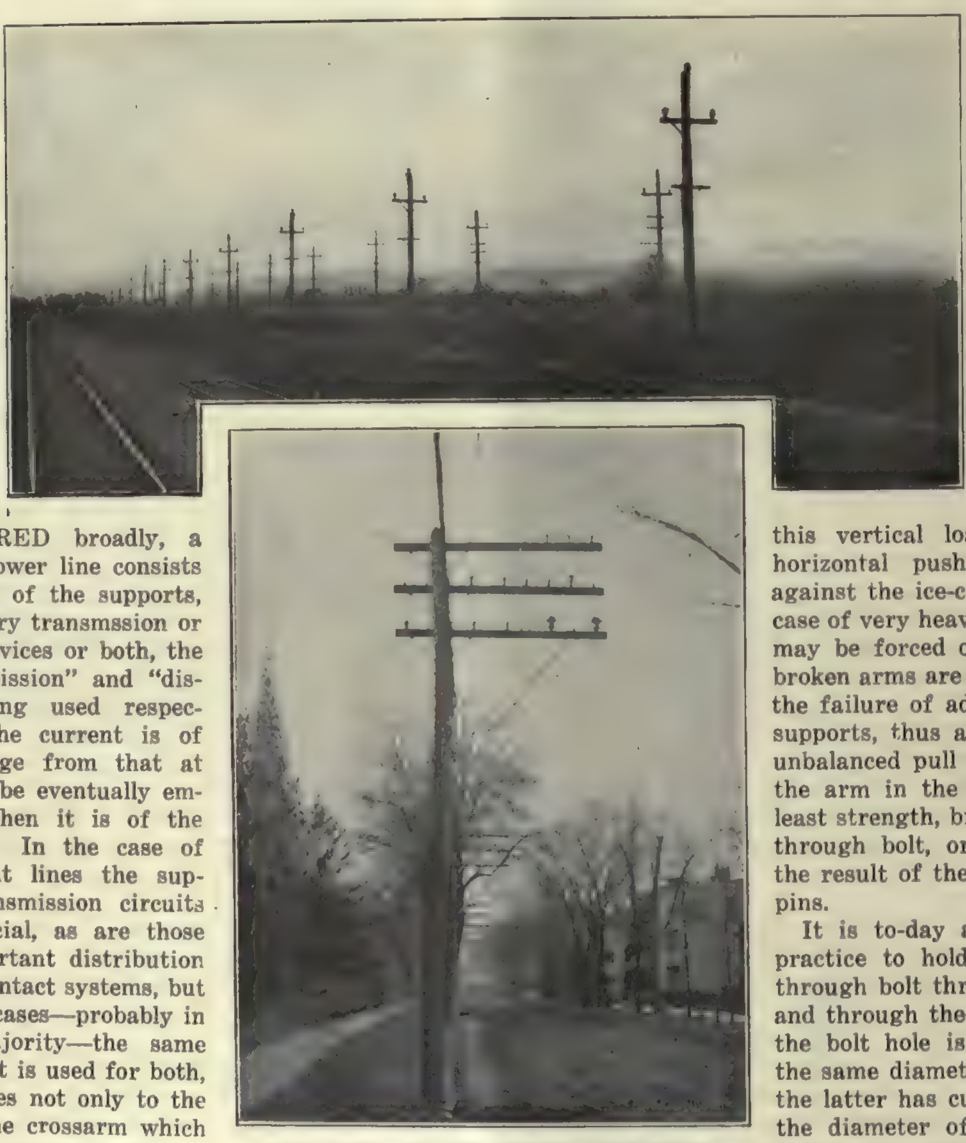
House paint or its equivalent may be good enough for a subway car which always runs underground, but it isn't the most attractive finish for a public conveyance which does most of its work in the light of day. Even the negligent house owner will paint his dwelling spick and span if he wants to sell it and thinks thereby he can make it look much more attractive. What, then, about the car which is selling itself always? Should a company be bound down to use dull, drabby colors because they happen to wear better or should it adopt a combination that will make "a hit, a most palpable hit" with the riding prospects? Orange and blue, for example, may not be the most durable colors, but wasn't it shrewd business for the Charlottesville & Albemarle Electric Railway to adopt as its own car colors those of the University of Virginia? We shall not attempt to figure how many more rides, if any, were due to this color scheme, but we know that it met with acclaim from the townspeople, the faculty and the university. Good-will is a precious asset to be acquired in divers ways.

It was the bold and irrepressible Peter Witt who suggested one day: "Why not paint electric cars cream white?" This may be unprecedented in America but it isn't in Europe. If memory serves aright, cream is the shade (or rather the *light*) used by the Cologne-Bonn interurban railway and a number of city railways on the Continent. Whether advertising value was in the minds of their operators we know not, but that the cars looked more inviting than shades too akin to dust goes without saying. White cars like white gloves simply must be kept up to the mark. We should expect the modern enamels of any shade to withstand better the frequent but inexpensive use of mop, cloth and squeegee than the old-fashioned paints and varnishes. It is not up to the master painter to recommend such drastic changes as these, for his must be the path of economy for its own sake. The policy of selecting car colors on the basis of their advertising value is one that belongs wholly to the "Selling Rides Department"—when we get that department!

# Insuring Durability of the Pole-Top Fittings

### The Author Takes Up Details of Attaching Crossarms to the Pole, Bracing Them in Place and Providing Insurance Against Breakdown Under Every-day and Emergency Strains

BY CHARLES R. HARTE
Construction Engineer The Connecticut Company, New Haven, Conn.



TOP VIEW, TRANSMISSION LINE WITH SINGLE BRACE. BOTTOM VIEW, OUTRIGGED ARMS

CONSIDERED broadly, a pole or tower line consists primarily of the supports, which may carry transmssion or distribution devices or both, the terms "transmission" and "distribution" being used respectively when the current is of different voltage from that at which it is to be eventually employed, and when it is of the same voltage. In the case of very important lines the supports for transmission circuits are quite special, as are those for very important distribution circuits and contact systems, but in very many cases—probably in the large majority—the same type of support is used for both, and this applies not only to the pole, but to the crossarm which carries the conductors.

As with so much of the overhead, the old telegraph practice has been continued with little modification of material or methods, the changes being those necessitated by the heavier loads, and to-day our crossarms are "gained" in the pole, held to it by a through bolt, and kept from tipping by braces attached to arm and pole, practically as in the case of signal and communication lines.

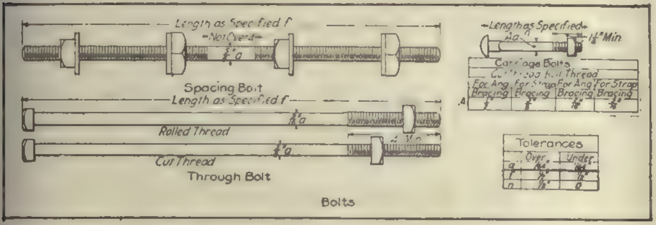
## WHY CROSSARMS SOMETIMES FAIL

In regular service a crossarm is a beam supported at its middle and carrying the vertical load of the weight of the wire supported (one-half of each of the ajacent spans) plus the maximum ice load on that wire. In case of wind, the stress is the resultant of this vertical load and of the horizontal push of the wind against the ice-covered wire. In case of very heavy sleet the arms may be forced off the pole, but broken arms are generally due to the failure of adjacent spans or supports, thus allowing a heavy unbalanced pull to come against the arm in the direction of its least strength, breaking it at the through bolt, or splitting it as the result of the leverage of the pins.

It is to-day almost universal practice to hold the arm by a through bolt through its middle, and through the pole. In cedar, the bolt hole is often bored of the same diameter as the bolt if the latter has cut threads, or of the diameter of the threads if these are rolled. Cut threads are cut out of the bolt, and unless the latter has upset ends, which is very unusual for overhead work, the effective diameter of the bolt is less than the actual shank diameter; rolled threads, on the contrary, are rolled up from the shank, so that the effective diameter and the actual shank diameter are the same, but as the diameter over the threads is greater, holes for rolled bolts have to be a little larger than for the bolt of the same size with cut threads.

In chestnut the hole is usually bored a trifle larger, and it is invariably larger in the crossarm itself. While there is little likelihood that the arm will actually be split, a tight fit generally results in breaking out bad splinters on the face, for the bolt should be driven through the pole first. Perhaps it would be better to say that it is generally so driven, for some overhead men claim that if good material is used the bolt will also require replacement by the time an arm has to be replaced.

Then the "advantage" of not having to pull the bolt through the pole to remove the arm quite disappears.



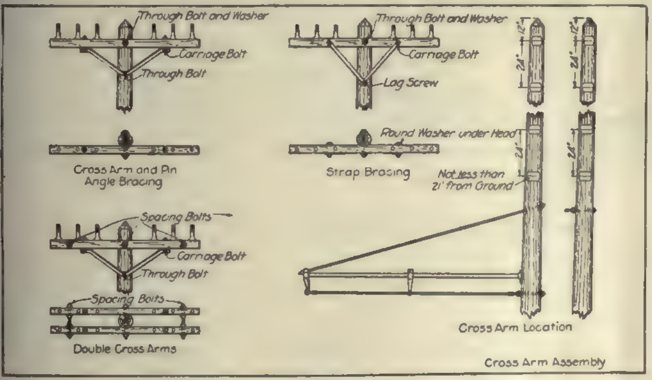
BOLTS FOR OVERHEAD LINES*

*This and the following line drawings are reproduced from the Engineering Manual of the American Electric Railway Engineering Association.

The arm is given a good bearing on the pole by a "gain," formed by making at right angles to the pole two parallel saw cuts each ¾ in. deep at the center, and a distance apart just equal to the depth of the crossarm. The wood between these cuts should be taken out with a broad chisel, and the resulting surface hollowed very slightly, so that when the arm is bolted on, it first bears at the edges of the gain, thus preventing rocking. If this is properly done, and the width of the gain is such as to give a tight fit, there need be little fear of any trouble under reasonable loading, but it is suprising how few linemen can really make a good gain.

This has led to the development of several types of patent gain. One of the simplest is a piece of sheet steel, curved to fit the pole, with lugs to hold the arm in place, a central hole permitting the through bolt to pass. Where the pole diameter at the arm is known and constant, and where the gain can be bent to this curvature this device is said to be very satisfactory, but the irregularity of the general run of natural poles makes necessary at least as much work as would insure good fitting wood gains, while a poor fit on the pole makes the patent gain as poor as a bad fit in wood.

For any but the heaviest of arms a ⅝-in. through bolt is sufficient, although a ¾-in. bolt is frequently and a ⅞-in. bolt occasionally used. The threads may be cut or rolled. The latter is better because the full section of the bolt is available, as the threads are raised on it, and the threads are more even and stronger than cut threads because the rolling gives a tough, smooth surface.



CROSS-ARM LOCATION AND ASSEMBLY

In either case the threads should be 4 in. in length to allow for variations in the pole diameter at the arm. For any given line the probable diameter can be estimated as soon as the pole-top design is determined, and the allowance of a small percentage of bolts longer and shorter by 2-in. steps will take care of unusually large or small poles.

It is almost universal practice to use square washers 2¼ x 2¼ x $\frac{3}{16}$ in. for either ¾-in. or ⅝-in. bolts. This gives a net bearing surface of a trifle more than 4½ sq. in. The standard round washer for ¾-in. bolts has a bearing area a trifle more than 2½ sq.in. The difference in cost is not such as to warrant taking chances that the round washer is sufficient, although there seems to be little real evidence one way or the other.

### PREVENTING ROTATION OF THE CROSSARM

For the lighter arms and for many heavy arms also, the strap brace is the chief source of resistance against any tendency of the crossarm to turn about the through bolt. The brace is lag-screwed or bolted to the pole, and carriage-bolted to the arm at such points as to make an angle of approximately 45 deg. The usual practice, of course, is to use two braces, fastened to the pole by a single bolt or lag, and held to the crossarm by carriage bolts, the braces being below the arm. For moderate voltage transmission with two crossarms and for use with suspension insulators, however, the braces for the top arm are sometimes fastened to the pole above the arm, to give better clearance for the lower "phases." This location also tends to discourage "sneak" currents from following the metal and burning the pole and arm at the points of contact. It should be said, however, that the development of the modern insulator has reduced these burnings to a minimum, and a more general recognition of the fact that jumping the potential of a line built for 2300 volts to 6600 or 11,000 without changing insulators, is at least likely to cause annoyance. On the other hand, it is not so long since burning of the pole and arm at the points of contact was a very real danger, and there are still in operation lines with but a single brace and lines with wooden braces, designed to prevent such troubles. Indeed, on a line from Logan to Ogden and Salt Lake City, Utah, and possibly elsewhere, the crossarm was mortised through the pole and held in place by a wooden tree nail, cutting out not only braces but all metal as

ARMS PULLED OFF POLE BY SLEET LOAD

SUSPENSION ARMS WITH BRACES ON TOP

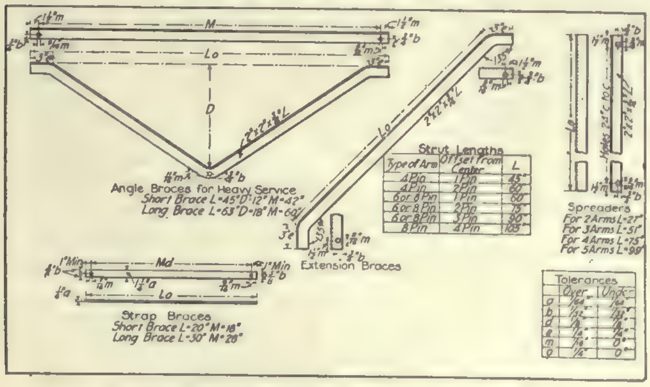
well, the insulator pins and their fastening being also of wood.

The standard strap brace is ¼ in. thick, 1¼ in. wide and 30 in. long. It has a hole of 9/16 in. diameter with its center 1 in. from one end, for the pole bolt or lag, and a similar hole of 7/16-in. diameter with its center 1 in. from the other end for the arm bolt. The material should withstand bending at the larger hole around a pin of diameter equal to twice the thickness of the brace until the ends are parallel, without fracture on the outside of the bend. For two-pin arms a brace 20 in. long is usually used, while for long arms, braces 32 in. long or even longer are sometimes employed. For heavy service, however, the present tendency is to use a single piece of angle iron of a broad V-form with the horizontal leg uppermost. The two ends are bent down so that when in place they are horizontal and the arm rests upon them, where it is held by carriage bolts which pass vertically through the arm. While various sizes of angle are used for braces, the usual section is 2 in. x 2 in. by 3/16 in. The standard sizes of braces are 63 in. and 45 in., measured along the crossarm, with "drops" at the bend of the V of 18 in. and 12 in. respectively. The pole bolt hole is 11/16 in. in diameter and the two carriage bolt holes are 9/16 in. in diameter.

33,000-VOLT TRANSMISSION LINE WITH WOODEN BRACES FOR ARMS

Note poor fit of top of right brace against pole.

As in the case of the crossarm bolt, the hole for the pole bolt for either type of brace is bored from the face or arm side of the pole to the back, but the bolt itself is driven from back to face, with a round washer under the head. To insure proper line-up in assembling, the braces are first bolted to the arm; the latter is next bolted to the pole and properly squared with it; the braces are then put in position and the exact position for the pole bolt marked. At the brace end of the bolt no washer is required as the brace itself serves that purpose.



CROSS-ARM BRACES AND SPREADERS

Strap braces are held to the arm by ⅜-in. carriage bolts, driven from the back of the arm outward; a round washer being put under the head, but none under the nut which fits against the brace. Angle braces are held by ½-in. carriage bolts driven down through the arm, with a round washer under the head; the nut, as in the case of the strap brace, requires no washer since it is against the angle.

A word might here be said about wood braces. These were employed somewhat when leaky insulators were more common, but the cost of properly fitting them in place left little to their credit, while the tendency of the wood to split if, as in many instances, they were bolted or nailed in place made them an element of weakness. To-day they are rarely seen.

### THE CROSSARM TENDS TO ROTATE HORIZONTALLY ALSO

Still another form of brace, somewhat different from those described, is used to prevent a crossarm from twisting horizontally on the pole. For a comparatively light strain a strip of angle iron of about the same length as the arm, and fastened to it at the ends, is carried behind the pole where it is anchored by the through bolt of the arm. If, however, there is a really heavy twisting pull the best plan is to install an I-bolt in the arm as near the pull as possible, putting a generous square washer under the nut and running an anchoring guy in the line of the pull, or as nearly in that line as possible, to some good anchorage. Most crossarms are installed singly and have equal lengths each side of the pole, but often "double arms" are used at points of extra strain, while cramped quarters sometimes necessitate "alley," "extension," or "outrigged" construction, which may also have to be of double-armed design.

ANGLE-IRON BRACE

The two insulators at top of arm are carried on a short arm giving spacing for 11,000 volts; main arms are bored for 33,000-volt spacing, the future potential of the line.

Double arms are practically what the name implies, two arms at the same elevation but on opposite sides of the pole. Where they are placed at an angle the line of the two should split the angle unless a much heavier pull is to be anticipated from one direction than from the other, in which case the arms should square with this direction.

### SOME HINTS ON INSTALLING DOUBLE CROSSARMS

The proper installation of double arms is not quite as simple as it looks, but there are a few "kinks" which help very materially. The two arms are held to the pole by the same bolt, which should be in the center of each "gain," but it is anything but easy to bore accurately through the pole. If the second "gain" is centered on the hole after it has been bored the two arms are quite unlikely to match. By cutting the "gains" properly opposite, however, and boring a little more than half way from each, the holes as a rule can be connected and the bolt driven through even if there is a small bend, and the brace bolt can be similarly installed.

By using a spacing bolt of the proper length instead of a through bolt (of course omitting the two inside nuts) either arm or brace can be removed without disturbing the other.

It is well to have a piece of soft steel, 3 in. or 4 in. long, with a hole about 2 in. deep tapped to fit the spacing bolt, which temporarily can be screwed on one end as a driving head. In the absence of this, two nuts can be used, the first being screwed on a short distance, and then the second one run on so that the end of the bolt lacks about ¼ in. of coming through.

The first nut is then screwed up against the second to lock it. If the bolt goes through reasonably easily a single nut on the end will serve, but the double nut is safer and the special head best of all.

Double arms should be tied into a rigid structure. This can be done by putting spacing blocks near the ends, of a length equal to the distance between arms at the pole, and bolting through both arms and the block. Variations in the poles and "gains," however, make necessary quite a little fitting for good work. A better plan is to use a regular spacing bolt, which is simply a rod of proper length threaded for all but about 4 in. at the center and having two nuts and washers on each end, one for each side of the arm. The bolt goes about one-eighth of the arm length in from the ends. The inner nuts are brought snugly against the arms and the outer nuts are then screwed against them on the outside, washers of course going between each nut and the arm face. Extension arms are usually "every-day" arms fastened to the pole at a point other than the middle. If the difference in length of arms is small they may be braced as usual, but if there is much overhang it is customary to put a regular strap brace on the short end, and a special, long, angle-iron brace which makes an angle of 45 deg. with the arm, on the other. For very long overhang or very heavy unbalanced loading this bracing is double, one on each side of pole and of arm. Where there are two or more arms, a vertical angle-iron "spreader" or "spacer" starts at the bolt which holds the diagonal brace at the arm and runs vertically, fastening to each arm above. This is also doubled for heavy work, and sometimes there are two such sets of spreaders, in which case one set is placed near the ends of the arms and the other a distance from the pole equal to about one-third the length of the long side of the arm.

TELEPHONE LINE WITH DEAD END TOP ARM AND SPECIAL BRACE

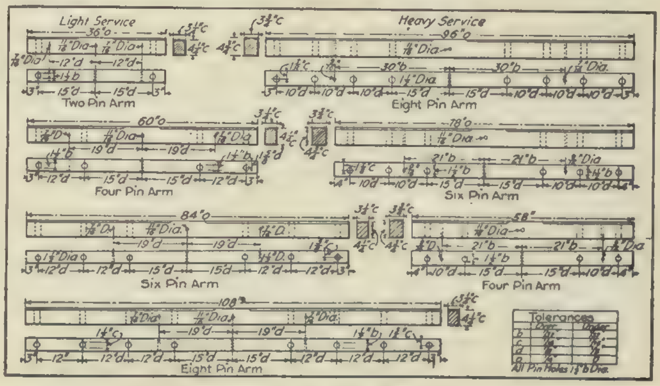
So much for the installation of crossarms, and the hardware in connection therewith. It might be well to mention that the latter has been pretty well standardized by the American Telephone and Telegraph Company, the Western Union Telegraph Company, the National Electric Light Association and the American Electric Railway Association in the order of their action. The fact that the last-named association has also standardized on this material seems to be known to comparatively few.

The arms themselves are less satisfactorily agreed upon. The A. T. & T., W. U. and A. E. R. A. agree upon the 3¼-in. x 4¼-in. section for light service arms, and the 3¾-in. x 4¾-in. for much of the heavy service. In 1917 about 75 per cent of the crossarms used were of these two sizes. The N. E. L. A., however, has 3½-in. x 4½-in. for its standard section, which has to be dressed from a 4-in. x 5-in. stick. The 3¼-in. x 4¼-in. arm can be cut from a 7-in. x 9-in. stick, making four, while the 3¾-in. x 4¾-in. arm is cut from the 4-in. x 5-in. stick, the same stick used for the N. E. L. A. smaller section. For very heavy transmission lines special sections are used, but here time and money can be saved by choosing sections which can be dressed readily from commercial sizes. There will be lost about ¼ in. each way at best, giving 3¾-in. x 5¾-in., 4¾-in. x 5¾-in., 3¾-in. x 7¾-in. and 5¾-in. x 7¾-in., for example, as finished sizes from 4-in. x 6-in., 5-in. x 6-in., 4-in. x 8-in. and 6-in. x 8-in. stock.

DOUBLE BUCK-ARMED POLE

Note spacing block at end of arm.

Pin spacing is more readily varied than is the section, and as a matter of fact there is quite a little variation among the several associations. Both the N. E. L. A. and the A. E. R. A. put the pole pins 15 in. from the middle of the arm, giving 30 in. of climbing space. The N. E. L. A. uses 14½-in. spacing for other pins on the four-pin and six-pin arms, and 12-in. spacing on the eight-pin arm. The A. E. R. A. uses 12-in. spacing for other than pole pins on light service arms, and 10-in. spacing on heavy service arms. The A. T. & T. use 16-in. spacing for pole pins except in joint use, where this distance is doubled to 32 in., and 12-in. spacing elsewhere, while the W. U. uses 16-in. spacing for pole pins and 12⅜ in. elsewhere on the ten-pin arm, 19 in. and 15½ in. on the eight-pin arm, 19 in. and 17¼ in. on the six-pin arm, and 20 in. and 22 in. on the four-pin arm. Each association had good reasons for its choice, but the number is a little unfortunate.



WOOD CROSS-ARM

In the matter of physical properties and finish the "big four" are substantially in agreement although the wording differs somewhat. The A. E. R. A. specification is as follows:

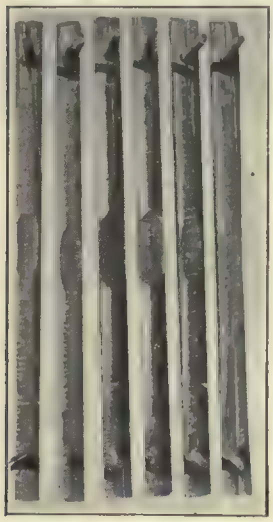
### SPECIFICATIONS FOR WOOD CROSSARMS

*Material Requirements.* Crossarms may be of cypress, Douglas fir, Norway pine or yellow pine, but must be thoroughly seasoned, sound, and free from wane or defects which would reduce strength; the grain must be close and not out of parallel with any edge of arm more than 1 in. in 3 ft. of length.

*Pitch Pockets.* Pitch pockets not exceeding 2 in. in depth, up to 12 in. in length or ¼ in. in width, not entering pin or bolt holes on the top or sides of the arm, will be permitted provided the area does not exceed ½ sq.in. if within 1 ft. of the center bolt hole, nor exceed 1 sq.in. if outside the 1 ft. limit. Pitch seams or streaks which do not open the grain are not considered "pockets."

*Shakes and Checks.* Ring shakes, end checks, or other checks entering pin or bolt holes will not be permitted; a few fine checks not entering pin or bolt holes, nor exceeding 6 in. in length nor ⅛ in. in depth, will be allowed.

*Knots.* No knots will be allowed within 24 in. of the center of any arm, nor entering any pin or bolt hole. Sound knots not exceeding ¾ in. diameter, and not entering any pin or bolt hole will be allowed between limits 24 in. and 36 in. from the center of any arm; outside limit 36 in. from the center of any arm, sound knots not entering a pin or bolt hole may increase in size to not exceed 1 in. diameter at the end of the arm.



FAILURE OF PINS AND RIMS UNDER CONDITIONS OF SERVICE

*Sap Wood.* Cypress arms must be free from sap wood or pitch heart; Douglas fir, Norway pine, and yellow pine arms may contain, on top or one side only, clear sap wood of maximum cross-section not exceeding 15 per cent of the total cross-section of the arm.

*Warp.* Crossarms must be out of wind; must not be bent edgeways in any direction, nor sideways in more than one direction; and a straight edge applied to a concave side must not show offset exceeding ⅛ in. per foot of length of the arm.

*Finish.* Arms must be delivered unpainted with every face planed, square to adjacent faces and bored as specified. Holes must be accurately located, square with face, clean cut, not badly splintered where the bit passed out, and within $\frac{1}{32}$ in. of the correct diameter.

*Boring.* (*a*) All crossarms must have holes 1¼ in. diameter on the center line of the top, one on either side of and with the center 15 in. from the arm center, others 12 in. apart center to center on light service arms, and 10 in. on heavy service arms. (*b*) All crossarms must have one center hole $\frac{11}{16}$ in. diameter in the center of the side. (*c*) All crossarms to be strap braced shall have two holes each $\frac{7}{16}$ in. diameter on the center line of the side, one on either side of the center hole; 12 in. distant for two pin arms and 19 in. distant for all others. (*d*) All crossarms to be angle braced shall have two holes, each $\frac{9}{16}$ in. diameter on the center line of the bottom, and spaced one either side of the middle, 21 in. distant for four-pin and six-pin arms, and 30 in. distant for eight-pin arms.

*Classes and Section.* Crossarms are of two classes: Light service arms, 3¼ in. wide by 4¼ in. deep; and heavy service arms, 3⅝ in. wide by 4⅝ in. deep.

*Lengths.* Crossarms lengths must be as shown in the table at the top of the next column.

| Size of Arm | Light Service | Heavy Service |
|---|---|---|
| Two-pin | 36 in. | |
| Four-pin | 60 in. | 58 in. |
| Six-pin | 84 in. | 78 in. |
| Eight-pin | 108 in. | 96 in. |

NOTE: Accompanying illustrations show overhead line material as described in the preceding specifications.

Wood crossarms are often painted, but if this is done before the sap is thoroughly dried out it is much worse than no treatment at all. It not only seems to accelerate decay but it also conceals the decay, usually until a bad failure tells the story. For this reason not a few overhead men install arms with no treatment whatever, but there is an increasing tendency toward the use of creosoted or kyanized arms, although the linemen dislike the occasional tendency of creosote to "sweat out" in hot weather. There is, too, a not entirely unwarranted fear that treatment tends to weaken wood, particularly in the case of treatments employing a fairly high temperature. That in such cases there has been an initial loss of strength and particularly a marked increase in brittleness is beyond question, but recent investigations show that there is at least a partial recovery after a short interval.

There have been various figures given for the strengths of crossarms, but most of them are the results of the United States Department of Agriculture tests (Forestry Service Circular 204). While they show the ultimate strength of arms rigidly held to the pole, and given equal loads at each pin, they are anything but correct for the service capacity of similar arms. The "pole" used in these tests had a piece of gas pipe as a liner for the through bolt hole, thus materially increasing the bearing area of the bolt, and a special heavy bracket supported the arm end of the through bolt. Both of these items gave a resistance to the combination of arm and pole far in excess of that which is had in usual practice. On the other hand, the braces were attached to the arm 14 in. instead of 19 in. from the through bolt, and if the drawing (Fig. 2 of the circular) is correct, they were fastened to the back instead of the face of the arm, both of which facts would reduce the capacity over that of usual practice.

In actual service failure usually occurs by the arm pulling off the pole, by the arm breaking from a side pull or by the arm splitting as the result of the pin leverage. This raises the question whether the present arm design is the most economical, particularly in the shorter lengths. There would seem little reason for providing great strength in a vertical direction if the strength against a side pull does not bear the corresponding relation to the stress likely to come in that direction, or if the arm support cannot safely carry as much as the arm. There is needed a series of service condition tests for, after all, it is the strength of the parts in combination with which we are particularly concerned.

Structural steel has been used to some little extent for crossarms, with various results. Two forms used for transmission lines have proved very satisfactory; the Byllesby "wishbone" type, and the Pierce "bo-arrow" form, each of which is substantially a Y, fabricated from angle iron and turned on its side. A number of angle, channel and built-up straight forms are also used for both distribution and transmission, but in this country there seems to be quite a little difference of opinion as to their desirability. Unquestionably the wood situation makes desirable the development of a good substitute, but the latter is not yet here.

# Car Performance from the Engineer's Office to the Track

## Degree of Accuracy to Which Performance of Railway Equipment Can Be Predetermined Is Shown by Comparison of Test Results with Calculations Made Before Test Motors Were Designed

BY C. W. SQUIER
Electrical Engineer

IN THE SERIES of articles which I have contributed to the ELECTRIC RAILWAY JOURNAL during the past year on the considerations which govern the choice of railway motors, I have described the methods commonly used for calculating the performance of motors previous to their design and operation. The degree of accuracy with which railway motor performance under actual operating conditions can be predetermined is surprising. In order to illustrate the close agreement which exists between theory and practice I shall in this article give figures for motor performance that were calculated before the motors were designed and compare these with results later actually obtained in service with the equipment.

In requesting the various motor manufacturers to submit bids and recommend motors, definite data were given regarding the service requirements. These included profile and alignment of a certain line that showed average characteristics, and a statement of the service features desired, such as schedule speed, duration of stop, duration of layover, average line voltage, train resistance values and car weight. In submitting their suggestions each of two manufacturers proposed to furnish two series, 600-volt, tapped-field motors of 140-hp. capacity at 600 volts for each car. Each submitted speed-time and power curves for operation over the line for which the profile and alignment were furnished. The schedule speed and energy consumption were calculated from these curves and were as follows:

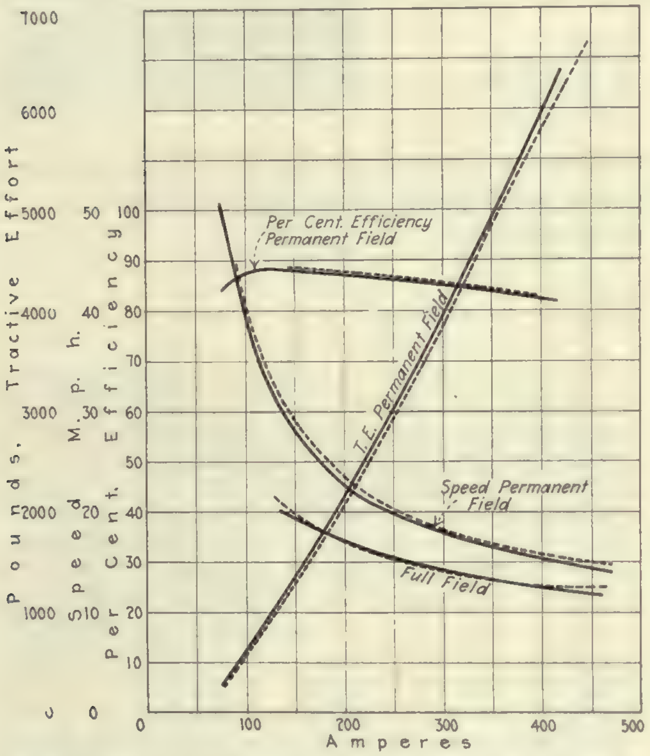
For motor No. 1 the energy consumption was 60.8 watt-hours per ton-mile, with a schedule speed of 14.9 m.p.h. and 38.8 per cent coasting. Motor No. 2 required 78.8 watt-hours per ton-mile with a schedule speed of 15 m.p.h. and 26.7 per cent coasting. By comparison of these figures it will be noted that motor No. 1 showed considerable advantage in the amount of energy required compared with motor No. 2. Motor No. 1 was geared with a ratio of 2.46, while motor No. 2 was geared with one of 2.65. Considerable study was given to this condition and many curves indicating speeds and the power consumed by the cars operating with the different motors were calculated by using the characteristic curves of the respective motors. Motor No. 1 was apparently better adapted for the service under all conditions.

After discussion of the results with the engineers of the several manufacturers, those responsible for the design of motor No. 2 agreed that they would render their motor as efficient and economical for the service as was motor No. 1. This they did by reducing the speed of the armature and by increasing the gear ratio. Many studies were again made by the various engineers with this redesigned motor to make sure that the motor was of proper design and gear ratio and the best for all service requirements as laid down and determined by previous operating data. It must be realized that these motors were being especially designed for the particular service requirements, and to meet these certain definite characteristics were required. In the theoretical calculations the motor which was the most economical in power consumption for the service was the one with a low armature speed and with as high a gear ratio as the service permitted, and the fields of the motors were arranged to be tapped when the motors were connected directly across the line in order to get a sufficient maximum speed to make the high schedules on the various runs as specified. This combination of low armature speed, very high gear ratio and tapped-field combination made rapid acceleration possible with a reasonable starting current and involved the minimum losses in the resistors.

### COMPARISON OF THEORETICAL CHARACTERISTICS WITH THOSE ACTUALLY OBTAINED

An accompanying illustration shows the characteristic curves for the motor which was finally adopted. The full lines show the characteristics as calculated from design and the dotted curves are the characteristics which were actually obtained when the motors were tested at the works of the manufacturer. By comparing these two a better idea can be obtained of the closeness with which theory can be made to agree with practice. The speed of the motor as constructed was slightly higher when operating with permanent or tapped field with the same current than the speed as calculated from design. When operating with full field the speeds above 175 amp. and below 325 amp. were slightly lower than that calculated, but for current values below 175 amp. and above 325 amp. they were slightly higher. The efficiency of the motor as constructed was slightly higher than the calculated efficiency for all current values above 145 amp. and for speeds below 30 m.p.h. The assumed gear losses which were used for the theoretical calculations were 9.5 per cent at 75 amp., 7.5 per cent at 90 amp., 5.5 per cent at 120 amp., 5 per cent at 150 amp. and 5 per cent at 180 amp.

After the motors were received by the railway company and the cars were completely equipped ready for operation, elaborate arrangements were made to check the performance of the motors to permit accurate comparison with the preliminary calculations. A section of track was set aside for use as a test track and runs were laid out so as to duplicate as nearly as possible the service originally specified to form the the basis for the motor design. Tests were made to determine all of the variables which had entered into the original calculations, and final tests were made to ascertain the power consumed in service, the temperature rise of the motors and other parts of the equipment and other desirable data which were used in calculating the motor capacities.



COMPARISON OF CALCULATED CHARACTERISTIC CURVES WITH THOSE OBTAINED FROM TEST

A two-car train was used for this test, each car being loaded with bags of sand so that the total weight per car was brought exactly to that specified for determining the equipment capacity. This train was operated over the several series of runs continuously at proper speeds with the amount of coasting, duration of stop, etc., regulated to the specification requirements and to produce the schedule speeds which had been originally given. The energy per ton-mile, exclusive of that used for compressors, heat and light, or in other words that used for actually propelling the train, was 62.97 watt-hours. The schedule speed corresponding to this power consumption was 16.1 m.p.h. and the coasting made was 43.4 per cent. By comparing these with the original figures which were determined by calculation, a fair idea can be gained of the closeness with which the equipment fulfilled expectations. There was an excess of 2.17 watt-hours per ton-mile shown by the test, but this could be readily accounted for by the schedule speed, which was 1.2 m.p.h. higher than that for which the original calculations were made. The percentage of coasting obtained in the test operation was 4.6 higher than that originally estimated.

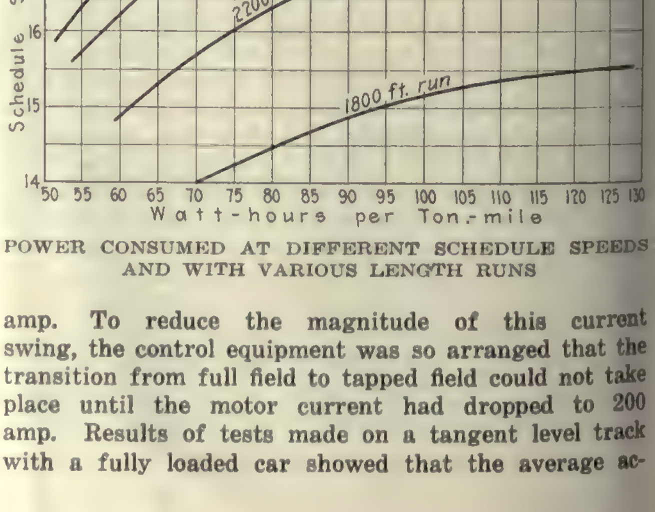
By comparing the characteristic curves previously mentioned these variations will be seen to be about what would be expected. As the speeds were slightly higher for the motor as finally constructed with the same current, it would be expected that a higher schedule speed could be made with a great percentage of coasting.

In order to determine the effect of the variation of schedule speed upon the power consumption, a series of graphs was plotted using theoretical figures and runs of several lengths made at different schedule speeds. A set of these graphs for runs of 1800 ft., 2200 ft., 2550 ft. and 2667 ft. is shown in an accompanying illustration.

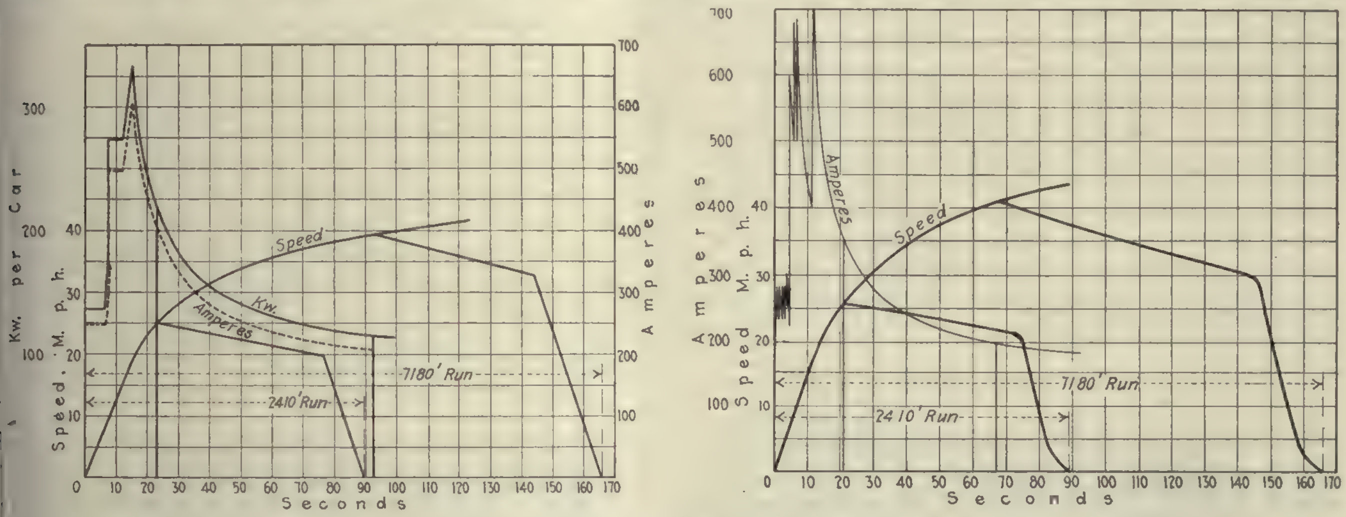
### OPERATING DATA WERE OBTAINED TO CHECK EACH PART OF THE SPEED-TIME GRAPH

For comparison of what may be termed a typical speed-time graph obtained under operating conditions with the theoretical speed-time graph originally plotted, many runs were made and accurate readings were taken. In the theoretical speed-time graph, originally plotted, an acceleration of 1½ m.p.h.p.s. was assumed. Theoretically this required a tractive effort of 3800 lb. per motor, which was produced with a current of 248 amp. per motor, operating with full field, and 302 amp. per motor on tapped field. These figures are all obtained from the theoretical characteristic curves of the motor plotted before this was designed.

Calculations showed that the peak to which the current would swing when passing from full to tapped field with an accelerating current of 248 amp. when operating with full field was excessively high as the maximum current swing was estimated to be about 490 amp. To reduce the magnitude of this current swing, the control equipment was so arranged that the transition from full field to tapped field could not take place until the motor current had dropped to 200 amp. Results of tests made on a tangent level track with a fully loaded car showed that the average ac-



POWER CONSUMED AT DIFFERENT SCHEDULE SPEEDS AND WITH VARIOUS LENGTH RUNS celerating current was approximately 260 amp., and this produced a rate of acceleration of 1½ m.p.h.p.s., ¼ m.p.h.p.s. higher than that originally considered. The calculated and test performance are shown in two other illustrations giving speed-time and current graphs for runs of 7180 ft. and 2410 ft., obtained both from theoretical calculations and from actual tests. By referring to the graphs obtained from actual service operation, the figures just referred to be will be seen to have been obtained. With the short run made at schedule speed of 15 m.p.h. with a twenty-second stop, the maximum speed obtained is seen to be 26 m.p.h. as against 25 m.p.h. originally estimated. With the long run of 7180 ft., the speed at the point of cut-off is 40.75 m.p.h. as against 39.2 m.p.h originally estimated. The shape of the speed-time graph with power on after the straight line accelerating period has been passed shows the test speed to be somewhat higher than the calculated speed, due to a higher train resistance having been assumed than was actually encountered; this was further demonstrated by the coasting tests described later.



SPEED-TIME, POWER AND CURRENT GRAPHS—AT LEFT, THEORETICAL GRAPHS AS CALCULATED; AT RIGHT, GRAPHS OBTAINED FROM TESTS

The net results of this difference in train resistance was to make the calculated time for the coasting period twenty-seven seconds shorter for the express run than was actually obtained on test. The coasting periods for the short local runs were practically the same on test as calculated. This is because the short runs required power for only a short time, so that the speeds at the point of cut-off were nearly the same.

To facilitate the calculations it was assumed that the voltage was increased uniformly during acceleration instead of by steps as in actual operation. This accounts for the difference in the character of the current and power consumption curves in the two cases. No appreciable error, however, was introduced by this assumption.

The average line voltage was assumed at 550, and that found on tests was 547, a very close agreement. The actual energy consumption for the short runs was 63 watt-hours per ton-mile, as against the 58 watt-hours calculated. This difference is readily accounted for by the increased rate of acceleration found n actual service.

To check the coasting portion of the speed-time graph, a large number of coasting tests were made by allowing the train to roll at various speeds over a section of tangent level track while readings of speed, time and distance were taken. In addition many tests were made by allowing the train to roll on grades of various degrees of steepness. A comparison of the figures actually obtained for train resistance showed that those originally used for the theoretical calculations were approximately 10 per cent high. These actual results, however, checked closely with some previous test figures developed by J. V. Davies from tests made on the Hudson & Manhattan Railroad, and which were used as a basis for the theoretical train-resistance values. To insure a conservative margin these test figures were increased somewhat for the theoretical calculations.

### AVERAGE BRAKING RATE CHECKED CLOSELY

A composite braking graph was also developed from a large number of tests. The average slope of the central part of this graph indicated a braking rate of about 2 m.p.h.p.s. However, there was some time lost between the movement of the brake handle and the actual application of the brakes. In order to make a smooth, service stop the braking rate was decreased and graduated off at the stop so that the average for the entire braking period was about 1½ m.p.h.p.s., the value originally assumed.

It should not be inferred from the above that the calculation of the operation of trains or cars can be reduced to an exact science, or that the time for any run and the resulting load upon the equipment can always be predetermined within the limits indicated. These test results were obtained under conditions duplicating as nearly as possible those assumed for the initial calculations. There were no delays such as occur in actual service due to variations in the duration of station stops or additional stops and slowdowns such as are necessary for signals. Throughout the test the schedule speed was kept almost exactly at that assumed in the initial calculations. A special man made a record of the time and gave his information to a motorman's "coach" provided with a stop watch. The coach instructed the motorman as to the length of time that the power should be kept on to maintain the schedule speed at the assumed value. Thus this operation was performed under ideal conditions and under the assumed conditions as nearly as it was possible to operate the train.

To indicate what variation might be expected from

TEST RESULTS WITH TRAIN IN PASSENGER SERVICE

| Average Length Run, Feet | Average Number Passengers per Car | Schedule Speed, Miles per Hour | Per Cent. Coasting Obtained | Watt-Hours per Ton-Mile |
|---|---|---|---|---|
| 2,352 | 21 | 15.8 | 26.3 | 87.5 |
| 2,352 | 22 | 15.2 | 26.0 | 97.8 |
| 2,909 | 31 | 15.7 | 24.8 | 82.6 |
| 2,909 | 14 | 16.6 | 20.0 | 80.6 |
| 2,909 | 38 | 15.6 | 25.6 | 83.9 |
| 2,909 | 23 | 15.4 | 19.9 | 80.2 |
| 2,909 | 28 | 15.7 | 25.8 | 82.7 |
| 2,909 | 31 | 16.3 | 25.5 | 74.1 |
| *2,770 | 26 | 15.8 | 24.2 | 82.4 |
| †2,410 | 200 | 16.1 | 44.1 | 63.0 |

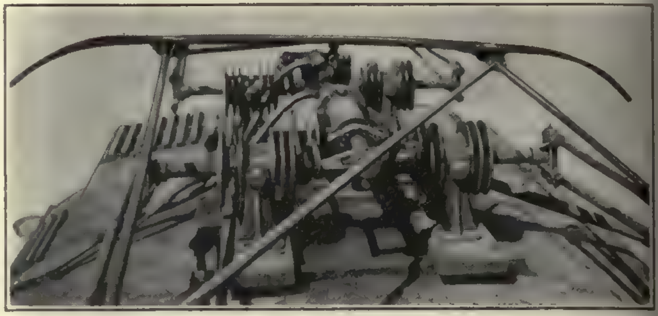
* Average for above eight runs.

† Results of test with train operated in service duplicating theoretical assumptions.

this operation when passengers were being carried and the train operated in regular service another series of tests were made. These, of course, included the incidental delays due to various causes such as high winds, signal stops, variation in the duration of stops, and special stops and slowdowns. The results of eight runs made in passenger service are given in an accompanying table and for convenience in comparing these figures with those obtained from tests under ideal conditions these test figures are given below the averages. The average length of run in passenger service was a little more than 300 ft. longer than that in the test service. The schedule speeds were almost the same, being 15.8 m.p.h. in actual passenger service against 16.1 m.p.h. for the test service. There was a large decrease in the per cent of coasting obtained under actual service conditions, this being reduced from 44.1 per cent to 24.2 per cent. The power consumption, of course, increased correspondingly, the increase being from 63 to 82 watt-hours per ton-mile, that is practically 30 per cent.

A comparison of the results shows the great advantage which may be obtained by regulating the amount of coasting. As there was a variation in the schedule speed obtained, the watt-hours per ton-mile do not follow the percentage of coasting in all cases. These tests were also made with different motormen operating the train so that there was a difference in the operation due to the personal element as well as to traffic conditions. After all is said about the close agreement of theoretical calculations with results actually obtained in operation, the final element in producing efficient operation is the human element. The same accuracy and analytical common sense essential in methods of work and calculations are likewise essential in the operator.

This comparison emphasizes the fact that proper allowance must be provided in the preliminary calculations for equipment so as to make up time in case of delays. The examples given, however, show that when the conditions of operation are specified, the actual performance of the electrical equipment for a given service can be predetermined with considerable accuracy, and in most cases this can be done without making very elaborate calculations.



NEW TYPE OF PANTOGRAPH SHOE IN POSITION SHOWING CONNECTION DETAILS

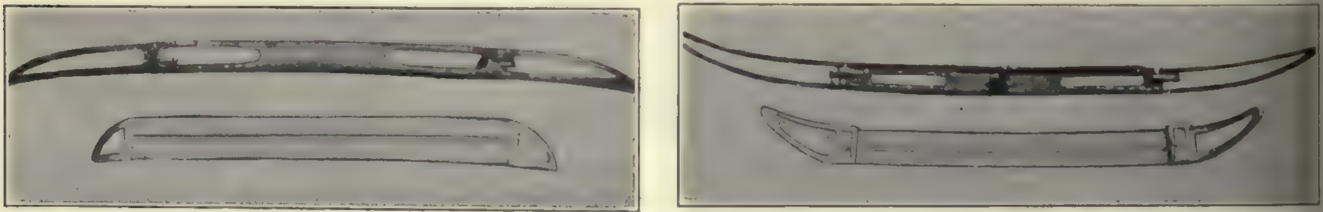
# Longer Life With Lower Cost for Pantograph Shoes

## High-Speed Line in Colorado Gets 30,000 Miles From Its Trolley Shoes at Cost of 60 Cents Per Shoe

THE Denver & Interurban Railroad, Denver, Col., operates 45 miles of 11,000-volt, alternating-current, single-phase catenary system between Denver and Boulder, Col., with a short branch to Eldorado Springs, a popular summer resort located in a canyon of the Rockies. Boulder, a city of 15,000 population, harbors the State University with about 1500 students and the finest armory in the State where several hundred soldiers were trained during the war. The interurban line, which operates on a private right-of-way except within the city limits of Denver and Boulder, carries by far the greater part of the local traffic between these two cities and maintains an hourly schedule during the day and evening. The 60-ton motor cars in regular service average 5000 miles a month and travel of very high speeds, often hauling trailers.

This service is very hard on the pantograph trolley shoes. The type which has been in use for some years consisted of a center section made of $\frac{1}{16}$-in. galvanized iron 6 in. wide and with aluminum ends as shown in the lower parts of two of the accompanying illustrations. The total reach of this shoe was 60 in., which proved to be too short, for due to the swing of the car the pantograph occasionally got caught in the catenary and was ripped off. To replace the renewable center when worn out the whole shoe had to be removed, as it was fastened to the base by a center rod. These shoes cost $1.05 each, and had a life of 10,000 miles.

A new type of shoe which is now in use is shown in the upper part of the illustrations just referred to. This shoe includes a center section 4 in. wide and 40 in. long, made of $\frac{1}{8}$-in. sheet steel. The ends are made of small steel angles, and the total reach is 90 in. The center may be quickly renewed without disturbing the ends. These shoes cost 60 cents each and last for 30,000 miles in this class of service.



AT LEFT, WEARING SURFACE OF OLD AND NEW TYPES OF PANTOGRAPH SHOES; AT RIGHT, UNDER SIDE OF OLD AND NEW TYPES OF PANTOGRAPH SHOES

# Mechanical Section of A. R. A. Meets at Atlantic City

### First Convention of Former M. C. B. and A. M. M. Associations Since 1916 — Exhibit, as Usual, an Important Auxiliary to Technical Sessions

AFTER omitting the two meetings covered by the war period, Section III, the mechanical section, of the American Railroad Association, which replaces the former Master Car Builders' and American Railway Master Mechanics' Association, met at Atlantic City beginning June 18. The meeting will continue to and including June 25. The exhibit of railway supplies is, as formerly, an important feature of the meeting.

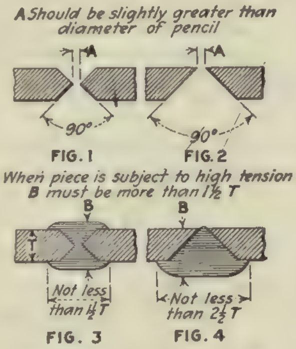
## GAS AND ELECTRIC WELDING AS APPLIED TO TRUCK PARTS

Among the committee reports of most direct interest to electric railway men presented during the first part of the convention, that on welding truck side frames, bolsters and arch bars takes first place. The committee recommends that in welding, either by the use of gas or electricity, care and judgment on the part of the operator are of prime importance. The operator's ability as to the desired proficiency should be certified by the mechanical officers in charge or by an instructor qualified by experience in general railroad welding with the method involved. The committee adds that as the metal added is liable to be porous and relatively brittle, and as the heat at the surfaces welded affects other sections near the weld tending to reduce strength and toughness, certain general rules should be followed substantially as below.

Welding cracks or fractures will not be permitted on axles, arch bars, car wheels or tires, truck equalizers, spring or bolster hangers, brake staffs, brake wheels, coupler bodies, knuckles, knuckle pins, locks, lifters and throwers, as well as parts made of alloy steel or heat-treated carbon steel. Building up worn surfaces will be permissible on parts subject to compression only; on *spring or bolster hangers** and in *holes in levers*, provided that the material remaining in the part is equal to at least 80 per cent of the original section; on *center plates, truck sides, bolsters and column castings*, provided the material remaining in the part is equal to 60 per cent of the original section; and on journal boxes, coupler bodies, knuckles, locks, lifters and throwers, flat spots on rolled steel wheels and tires if the thickness of thread is 1 in. or more above the limit of wear groove.

Welding cracks or fractures will be permitted on parts subject to compression only and general car parts not subject to high-tension strain except as otherwise prohibited, on car and roof sheets, draft castings, car sills, posts, braces, carlines, side plates and end plates, and on the following where welding is permitted only when the area of the crack is less than 40 per cent of the total area through the section at the point of fracture, but it is not permissible to weld any crack located within 6 in. of an old weld: *Cast-steel truck sides, pressed and structural steel truck sides, bolsters and transoms, cast-steel bolsters, brake beams and cast-steel coupler yokes.*

The edges of pieces for welding must be prepared as shown in Figs. 1 and 2. If both sides of the fractured member can be worked upon, the fracture should be prepared as shown in Fig. 1. Where only one side of the fractured member is accessible, the plan shown in Fig. 2 should be followed. The entire crack should be burned or chipped out sufficiently far back that there will be no portion of the crack in the metal. Failure to do this permits the crack to work its way across the metal to the farther side, due to the constant vibration, even after the weld has been made. A hole may be drilled at the end of the crack or check, and the chipping or burning should be directed toward the hole. The surfaces where the new material is to be applied must be clean and bright and reasonably smooth and, therefore, if the surfaces are prepared by the burning process the surfaces must be finished by chipping before welding.


A Should be slightly greater than diameter of pencil
A
A
90°
90°
FIG. 1
FIG. 2
When piece is subject to high tension B must be more than 1½ T
B
B
T
Not less than 1½ T
Not less than 2½ T
FIG. 3
FIG. 4

SECURING GOOD RESULTS IN WELDING

The portion of the part adjacent to the fracture should be heated before the welding is begun. In welding the operator should begin to weld at the point farthest away from the outside edge and work the weld towards the edge. All efforts must be made to prevent oxidation and to accomplish this the work should be placed at an angle that will allow the blowing out of all slag or impurities in the fuse metal, and the torch should be given a rotary movement to assist in their removal.

The new material must be deposited to the form shown in Figs. 3 and 4, in order properly to reinforce the weld, and "B" should be somewhat greater than "T." For cast-steel truck sides, pressed and structural-steel truck sides, bolsters and transoms, cast-steel bolsters, brake beams, cast-steel coupler yokes, car sills, posts, braces, stakes, carlines, side plates and end plates, "B" must be at least one and a half times "T."

In building up worn surfaces on spring or bolster hangers, or welding holes, cracks or fractures in the parts listed in the preceding sentence, with the exception of truck transoms welded in place, the parts must be carefully annealed by uniformly heating to about 1400 or 1500 deg. Fahr., and slowly cooling.

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*Parts of which the names are *printed in italics* may not be welded unless removed from the car or truck; but truck transoms may be welded in place by removing the truck from under the car body.

Worn surfaces, permitted to be built up to the original section by depositing of new metal thereon, must first be made clean, bright and fairly smooth, and after the metal is deposited they must be dressed to the required dimensions and gaged where necessary. When truck side frames and bolsters are welded the weld must be made smooth and a suitable record of the welding must be legibly stamped upon the weld.

In another report the committee on car wheels treated largely of items of steam railroad interest. However, it should be noted that the committee reported the decision of the executive committee that the association shall obtain standard rings of 33 and 36-in. diameters which can be used for reference. These rings are to be certified by the United States Bureau of Standards and will be used, in cases of dispute, to check wheel tapes.

### SOME SUGGESTIONS GERMAINE TO ALL STANDARDIZATION WORK

The character of the report of the committee on brake-shoe and brake-beam equipment was also largely of steam railroad interest. The committee made some general observations, however, which are suggestive to any other committees which have work to do in the line of standardization. One point is that when standards are "unapproved" by the authorities, the reasons for the failure to approve the recommendations should be stated so that the committee can benefit in further work.

The committee says further: "We have heard from time to time in the past of the representatives of some roads 'trying to force matters,' others being on the defensive, either on account of pending 'damage' to them, or of simply a 'disinclination to change anything,' and then, too, of the selfish influence of manufacturers' interests. It is the belief of the present committee, that each of its members should enter upon your committee work independent of the operation of any such impeding factors, as contributing to the fullest, through it their individual engineering judgment, skill, experience, etc., to the solution of the country's brake-beam and brake-shoe problems. No one should work upon the committee as representing the road from which he may happen to come, but as one called to co-operate with other committee members in the solution of the general questions involving all lines, to which as a committee member, his talents and efforts should be freely and impartially addressed. Conditions peculiar to his own line should only weigh with him, as with his fellow-members, in proportion to their significance when compared with other conditions represented in the country."

The brake-shoe and brake-beam committee is considering the advisability of presenting next year a report on the "state of the art" both as regards brake beams and brake-shoes. In the present report a number of charts have been presented, especially for the benefit of the younger members of the association who may be interested in the history of the standard and recommended practice sheets, showing the changes which have been made in these sheets during recent years.

On motion of the committee on nominations the following were elected to serve for two and one years respectively: Chairman, W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific Railroad; vice-president, James Coleman, superintendent car department, Grand Trunk Railway. Seven members of the general committee were also elected to serve for two years and seven for one year.

### EXHIBITS BIGGER AND BETTER THAN EVER

In number and variety of material displayed the exhibits surpassed those of any previous similar railroad convention. They totaled 301, and covered about 93,500 sq.ft. of floor space. The previous record was made in 1913 when there were 277 exhibits in a floor area of 87,360 sq.ft.

The general impression conveyed was that a large number of parts which formerly had been specified and designed by the operating companies were now being taken up vigorously by the manufacturers and produced as specialties. Steel in all its various forms has been used extensively and increasingly.

The exhibits of machine and shop tools were especially elaborate. The improvements in this class of machinery have resulted from an endeavor to cut down the time and labor necessary to machine various parts. Provision for more rapid and efficient setting up of the work and for insuring greater reliability are the most conspicuous.

The scarcity of labor during the war has evidently stimulated the development of automatic machines. The continued use of these machines should lead to far reaching economies in electric railway shops which manufacture or finish their own repair and maintenance parts. One operator can run from two to four machines which turn out the work as rapidly as a turret lathe and much more quickly than a center lathe.

The development which has been made in automatic chucking devices is surprising. A form of magnetic chuck shown provides a rapid method of preparing parts for face grinding. Electric railway mechanical departments will certainly soon show the benefits to be derived as a result of the rapid progress made in shop tools.

Other exhibits of particular interest to railway shop men were those displaying hoists, travelers, jacks and other lifting devices. Special features displayed in connection with these were designs to facilitate the handling of light parts efficiently and rapidly and at the same time to provide sufficient capacity for lifting heavy parts. There were many exhibits of pneumatic and electric shop tools. These portable machines are adapted for electric car repairs which can be made over the shop pits without dismantling the various heavy parts. The exhibits included both pneumatic and electric drills, reaming machines, cutting guns, grinders, riveters, hammers, saws, chippers, bolt drivers and rammers. The use of special heat-treated steel in the construction of these tools marked an advance of interest.

The several displays and demonstrations of electric truck tractors showed their particular adaptability for use in electric railway shops and particularly those in which new equipment is being installed on cars. The low-platform types with provision for elevating, lowering and dumping, are especially designed for use in shops where the space is limited and where sharp turns are necessary. The removal and reinstallation of compressors or other heavy electrical equipment installed underneath car bodies can be handled quickly and efficiently with one man and these tractors provide efficient means for replacing the work and labor used with hand trucks, wheelbarrows and other means of transportation in shops. Provision is made for hauling trailers as desired.

The rapid progress that welding has made during the last few years is indicated by the large amount of equipment of this character displayed. This included all classes of gas, electric and thermit welding apparatus. In the electric exhibits both alternating-current and direct-current motors were used to drive generators or were driven from gas engine or line shaft. Systems requiring no auxiliary equipment were also shown, some for use on circuits of voltage as low as 125.

In one welding display a large number of articles of artistic design and workmanship made with constant-energy sets showed the possibility of using welding apparatus for delicate operations and specimens of large welds exemplified the rugged work that can be accomplished with this system.

Master mechanics and superintendents of equipment of electric railways found plenty to occupy their attention in the exhibits of car parts and car fixtures, specialties and appliances. These included new types of seats and seat parts, car trimmings, hardware, curtains, safety treads, as well as drawn steel and pressed-steel shapes and stampings. An anti-rattling and window-sash brake device of new design is arranged to retard the downward movement of the sash and offer no resistance to the sash being raised. Two springs of different strength are used. In raising the sash a shoe compresses the weaker spring and the window can be easily raised. In lowering, the shoe automatically slides to a position to compress the heavy spring. This increases the pressure and prevents the sash from falling.

The display of car heating equipment included electric heaters, switches, thermostats, etc. Improvements in electric heater construction provided for ventilated cores with a case construction to give better and more efficient radiation of heat. Special alloy wire is used exclusively for heater coils. Great advances have been made in providing binding posts and special connectors for attaching the wiring. In former days heaters were furnished with copper insulated leads soldered to the coils. This necessitated making a splice to connect them, and the solder often softened from the heat. By attaching the ends of the coils direct to terminals furnishing additional provision for connecting the outside wiring, troubles of this nature are avoided. Lightness of construction is obtained by using sheet-steel and other sheet-metal punchings instead of castings.

A 600-volt portable cab heater with plug socket was a special feature. This should be of great benefit for cars with motormen's caps or in cases where train operation is employed.

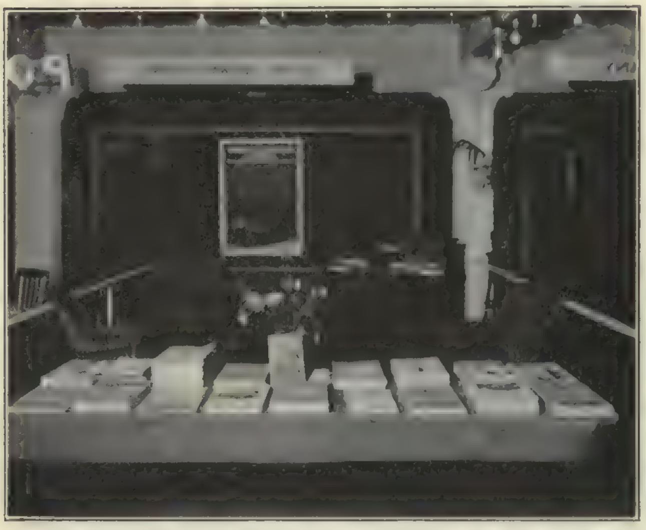
For shops and stations wall and floor type heaters are arranged for mounting in batteries so that any number of units may be employed.

Improvements in thermostats included moulded insulating bases for mounting and provision for removing the contact portion complete. Ample space with binding posts for wiring is a feature. Covers are fastened with through screws so they can not be removed unless the complete thermostat is loosened. The regulating switches for thermostatic control are provided with blowout for the main contacts. Relays have exposed contacts for ready inspection made of german silver or "monel" metal. Where equipments are installed underneath cars waterproof boxes are provided. These are arranged for mounting at either top or back, have binding posts for attaching all wires and are provided with knockouts so that the wiring may be brought inside the box in conduit.

Other exhibits of especial interest to rolling-stock engineers were those of trucks, wheels, brakes, brake-shoes slack adjusters and foundation-brake rigging. In the various trucks and truck parts shown special attention had been given to the design of springs, journal

250-TON, 4800-HP. SINGLE-PHASE, THREE-PHASE PENNSYLVANIA LOCOMOTIVE, SHOWN AT ATLANTIC CITY boxes, bolsters and method of suspension. A special construction for guiding the bolster consisted in providing slots in the ends of the bolster, both forward and behind the columns. Carrier bars pass through these and rest on the trunnions of the spring caps, thereby forming the support for the bolster and locking the side frames securely into position. As the carrier bars pass through the bolster at a point on a level with the journal bearings they deliver all side thrust to the frames, without any tendency to tilt the side frames, and thereby eliminate the necessity for a spring plank.

Included in the Pennsylvania Railroad exhibit on Tennessee Avenue near the railroad station is the 250-ton Pennsylvania electric freight locomotive. This represents the present maximum capacity for a single-cab unit. The principal object in the design was to concentrate the greatest power possible within the limitations imposed by existing track structures, clearances and modern electrical development. This locomotive has 4800 hp. capacity, with 140,000 lb. starting tractive effort. The free running speed is 20.6 m.p.h. Power is received from a 11,000-volt single-phase contact wire and fed through a transformer and phase converter to three-phase induction motors geared to a jackshaft. Some of the principal dimensions are: Total weight of locomotive, 250 tons; weight on drivers, 210 tons; number of driving axles, 6; capacity of locomotive—one-hour rating, 4800 hp.; starting tractive effort, 140,000 lb.; tractive effort at hourly rating of motors, 87,200 lb.; speed, 20.6 m.p.h.; total wheelbase, 63 ft. 11 in.; rigid wheelbase, 13 ft. 4 in.; overall length, 76 ft. 6½ in.; height from rail to locked position of pantograph, 15 ft. 6 in.; height from rail to top of cab, 14 ft. 8 in.; width over cab body, 10 ft.; overall width, 10 ft. 1 in.; driving wheelbase, 38 ft. 8 in.; diameter of driving wheels, 72 in.; diameter of pony wheels, 36 in.; weight on each pony truck, 20 tons; voltage of locomotive, 11,000 a.c. Two of these engines in regular service will handle a 6300-ton train up a 1 per cent grade of 24 miles at a constant speed of 20.6 m.p.h.



ELECTRIC RAILWAY JOURNAL BOOTH AT THE A. R. A. CONVENTION

This locomotive was built at the Altoona shops of the Pennsplvania Railroad and the design was evolved under the direction of J. T. Wallis, general superintendent of motive power, Pennsylvania Railroad, together with B. G. Lamme, chief engineer, Westinghouse Company.

The track exhibits were of particular interest this year. In addition to the exhibits of railroad equipment there were a number of heavy railroad mounts for the Army and Navy Ordnance which demand the natural interest attaching to equipment of this character at the present time and also are interesting due to the problems of extraordinary stresses which had to be solved in designing this equipment. They show in a general way the gigantic war activities which were engaged in by the manufacturers. The railway mounts include two 14-in. army rifles as well as several smaller sizes and a 12-in. mortar. The mounts for the 7-in. and 8-in. army rifles were of the well-car type carried on standard M.C.B. 50 and 70-ton trucks respectively.

These exhibits were shown through the courtesy of the Ordnance Department of the United States Navy and were in charge of naval officers and enlisted men together with representatives of the manufacturers.

Among other exhibits of special interest to electric railway men were those of storage batteries, electric headlights, paints, insulating material, air hose fittings, ventilators, journal box packing, roller bearings, draft gear, couplers, steel castings, bolts and nuts.

## Iowa Railway Men Meet

THE Iowa utilities were in convention as this issue of the JOURNAL goes to press. The Iowa Electric Railway Association meeting at Colfax, Iowa, officially opened its railway sessions on Thursday morning of this week, but on Wednesday afternoon a joint session was held with the Iowa section of the National Electric Light Association during which a paper on the Iowa State Board of Conciliation was read by Dean Raymond of the State University.

The session on Thursday morning was called to order by Vice-President F. J. Hanlon, general manager Mason City & Clear Lake Railroad, in the absence of President C. E. Fahrney, general manager Ottumwa Railway & Light Company. Following the disposal of routine business, R. J. Smith, superintendent way and structures Tri-City Railway Company, Davenport, opened the discussion on the best paving to be used in connection with track, with reference to advantages of cement, creosote blocks, brick and asphalt. Mr. Smith gave as his opinion that brick laid in grout and with joints filled with grout gives the best paving where traffic is not extremely heavy. A general discussion followed substantiating this opinion.

The afternoon session opened with papers on the safety car by T. C. Roderick, assistant general manager Tri-City Railway Company. This was followed by extensive discussion showing great interest in the subject, all the comments being favorable to the car and the discussion centered on details. The second paper was on the automatic control of substations and was read by C. W. Place, engineer of the General Electric Company. The presentation of this paper was followed by a general discussion on reclaiming of track and special work by welding and grinding, led by R. J. Smith.

At the executive session J. P. Ingle, manager Keokuk Electric Company, was elected president of the association for the coming year and member of board of directors for five years. Abstracts of the papers presented at the Iowa meeting most closely allied to the electric railway industry will appear in a later issue of this journal.

# 1918 Data for the Pioneer Constant-Speed Electrification*

### In Cascade Tunnel, Electrified Ten Years Ago, Great Northern Railway Uses Constant-Speed Four Motor Units on 1.7 Per Cent Grade

BY E. MARSHALL

Electrical Engineer, Great Northern Railroad, St. Paul, Minn.

IN 1909 the Great Northern Railroad began the operation of four electric locomotives through the Cascade tunnel, in the State of Washington, to do away with smoke conditions of steam operation. This tunnel is about 14,000 ft. long with a uniform grade of 1.7 per cent eastbound. In the yard of the west end of the tunnel there is a grade of 2.2 per cent on which trains must be started. A train is brought to this grade by three Mallet locomotives and is taken, together with the three idle locomotives, up the grade and through he tunnel in two cuts by three electric locomotives.

CASCADE TUNNEL LOCOMOTIVE OF GREAT NORTHERN RAILWAY

The electric locomotives are four in number, in single nits, each with four motors. Each motor is a threehase 25-cycle, slip-ring induction motor, running at a ynchronous speed of 375 r.p.m. Its capacity is 250 hp. at a three-hour rating or 375 hp. at a one-hour rating. Each motor is geared to its axle by a pinion on each end of the motor shaft, making a double drive. The gear ratio is 4.26 and the driving wheels are 60 n. in diameter. This then gives a locomotive speed when the motors are running at exact synchronism of 15.79 m.p.h.

ABLE I—LOCOMOTIVE DATA, CASCADE TUNNEL ELECTRIFIED

| | |
|---|---|
| otal weight, lb. | 230,000 |
| Veight on drivers, lb. | 230,000 |
| umber of driving axles | 4 |
| umber of other axles | 0 |
| iameter of wheels, inches | 60 |
| ear ratio | 4.26 |
| umber of motors | 4 |
| utput of motor for one hour (nominal), horsepower | 400 |
| utput of motor for one hour (test), horsepower | 505 |
| ise in temperature, dehrees Fahr. | 75 |
| utput of motor for three hours (nominal), horsepower | 250 |
| utput of motor for three hours (test), horsepower | 397 |
| ise in temperature, degrees Fahr. | 75 |
| rced ventilation, cu.ft. per minute | 1,500 |
| umber of poles on motors | 8 |
| requency, cycles per second | 25 |
| nchronous speed of motors, r.p.m. | 375 |
| oltage between terminals | 500 |
| ynchronous speed of locomotive, m.p.h. | 15.7 |
| umber of transformers | 2 |
| igh potential voltage of transformers | 6,000 |
| ating of transformers (three hours), kva | 400 |
| rced ventilation, cubic feet per minute | 1,500 |
| umber of steps in control | 13 |
| ntinuous rating locomotive, pound tractive effort | 25,00 |
| celerating rating locomotive, pound tractive effort | 38,000 |
| omentary rating locomotive, pound tractive effort | 56,000 |
| aximum rating locomotive, pound tractive effort | 72,000 |
| ngth over all of locomotive | 44 ft. 2 in. |
| tal wheelbase | 31 ft. 9 in. |
| gid wheelbase | 11 ft. 0 in. |

TABLE II—OPERATING DATA CASCADE TUNNEL ELECTRIFICATION

| | |
|---|---|
| Freight mileage | 24,528 |
| Return (idle) mileage | 24,528 |
| Passenger mileage | 13,020 |
| Passenger (idle) mileage | 13,020 |
| Special mileage | 12 |
| Special (idle) mileage | 12 |
| Total | 75,120 |
| Tons 1 mile, cars and contents | 8,461,770 |
| Passenger train cars, 1 mile | 48,096 |
| Average gross tons per engine-mile | 345 |
| Average haul is double the above or | 690 |
| Cost of repairs, total | $5,653.91 |
| Miles per pint of oil, valve | 313 |
| Miles per pint of oil, engine and car | 19 |
| Cost per mile for repairs, in cents per mile run | 7.53 |
| Cost per mile for wages, in cents per mile run | 27.39 |
| Cost per mile for lubricants, in cents per mile run | 0.2 |
| Cost per mile for supplies, in cents per mile run | 0.33 |
| Cost per mile for total, in cents per mile run | 35.45 |

This was the first constant-speed locomotive installation in this country, and constant-speed operation was selected because up to the time of its adoption this was the only method whereby regeneration could be secured without getting into what then seemed to be prohibitive complications. Regeneration appeared to be of great value for mountain grades. Of course, for this particular installation regeneration has proved to be of no value, on account of the short distance involved, and because we do not handle trains with the electric locomotives westbound. It was, however, part of a general scheme to electrify the entire mountain grade, taking in a distance of about 60 miles.

Power is delivered to the locomotives by a three-phase overhead-contact system, using two wires for two phases, and the track return for the third phase. The voltage is 6600 between the overhead wires and between each wire and the rail. The power plant is located 30 miles from the tunnel and generates power at 6600 volts, 25 cycles, three-phase. This is stepped up to 33,000 volts, and transmitted to a substation at Cascade tunnel where it is stepped down again to 6600 volts.

One of the features of constant-speed operation is that there must be ample power behind the locomotive to handle the load, as no increase in torque can be obtained by any means whatever. Also if the load is too great for the amount of power available, the requirements cannot be reduced as can be done with the series, or variable-speed motor. This makes it necessary to keep the train load down well within the power capacity of the system. An accompanying photograph indicates

AN EVIDENCE OF THE POWERFUL TORQUE OF THE GREAT NORTHERN LOCOMOTIVE what happened by reason of the constant speed characteristics of these locomotives. We operate with two locomotives in the rear of the train and one ahead. On one trip a fuse blew on one of the rear locomtives and this double unit stopped. It being dark in the tunnel the forward engineer knew nothing of this occurrence and his locomotive started to slip. As it could not exceed the speed of 15 m.p.h., he supposed he was moving through the tunnel. In due time he considered that he ought to be through, but discovered that this locomotive was standing still and had ground the rail two-thirds of the way through. The two accompanying tables on the preceding page give locomotive and operating data for this electrification. Table I contains the principal dimensions of the locomotive as well as its weight, output, rating, etc. Table II includes some very interesting figures on mileage made and data on the operating cost of these locomotives for the year 1918.

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*Previous articles on the Great Northern electrification will be found in the following issues of the ELECTRIC RAILWAY JOURNAL: Oct. 31, 1908, page 1276, details of locomotive; March 27, 1909, page 545, referred to in a general discussion; Nov. 20, 1909, page 1052, extended abstract of A. I. E. E. paper by Dr. Cary T. Hutchinson, read at New York meeting of Nov. 12; March 19, 1910, page 494, account of overturning of locomotives and other damage by avalanche at Wellington, Wash., March 1.

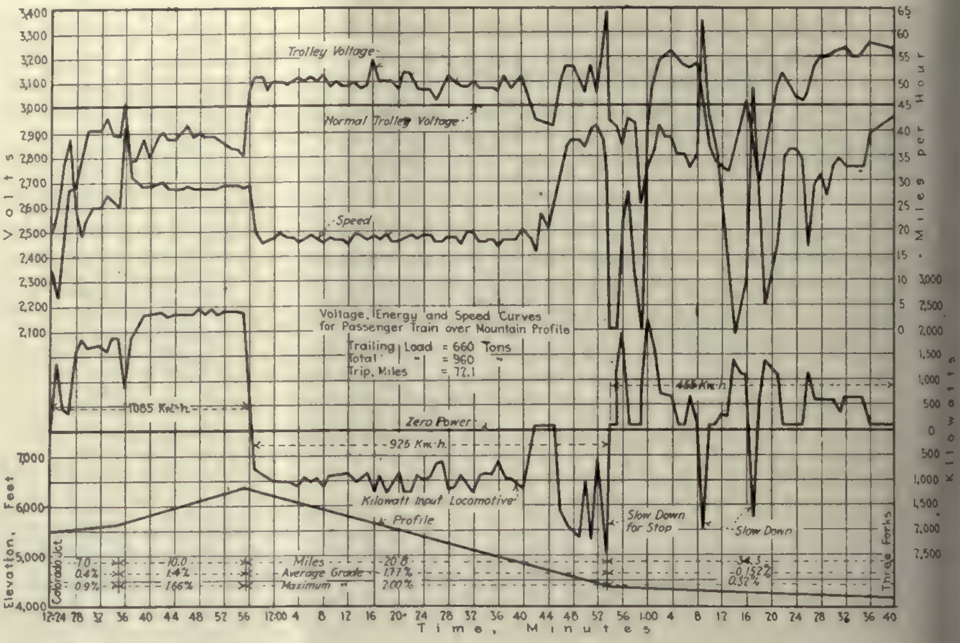


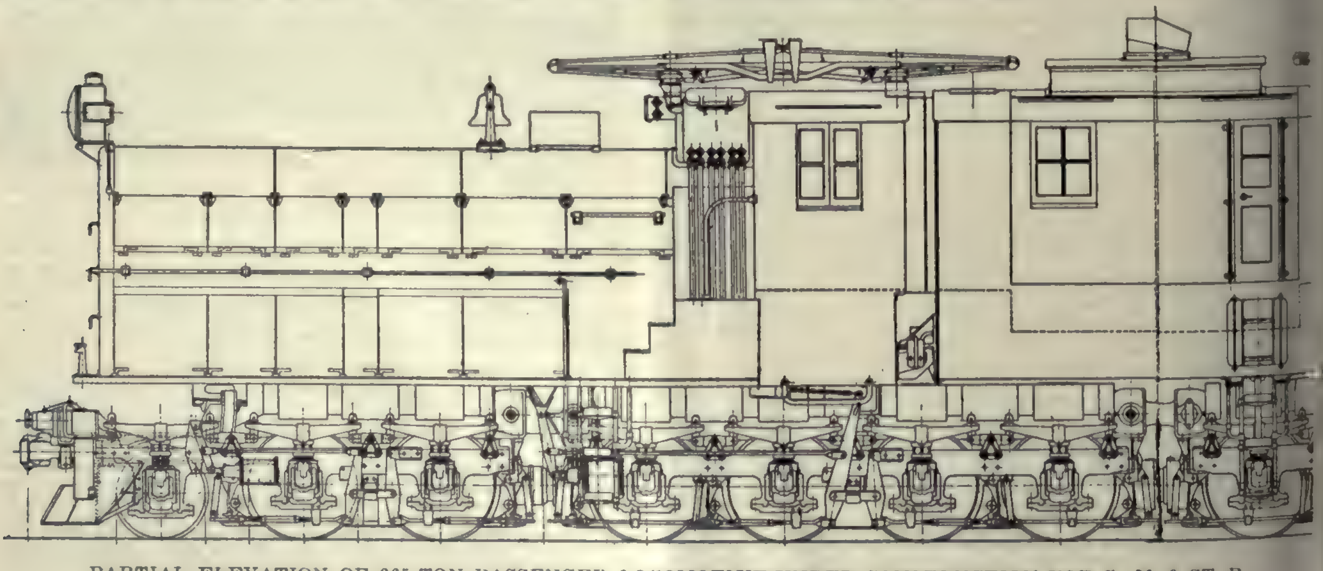
CHART SHOWING OPERATING CONDITIONS FOR 960-TON PASSENGER TRAIN OPER-ATING FROM COLORADO JUNCTION (BUTTE) TO THREE FORKS, MONT.

## Power Regeneration on the St. Paul

IN ITS June issue the *General Electric Review* reprints the paper read by W. B. Potter and S. T. Dodd before the Western Railway Club at Chicago on April 21 (published in this paper for April 26). The *Review* shows some interesting illustrations, not available at the time the ELECTRIC RAILWAY JOURNAL article was published, from which the accompanying two have been selected.

One of these illustrations shows some details of the new type of locomotive which the General Electric Company is building for the Chicago, Milwaukee & St. Paul Railway. The drawing indicates several differences in detail from that reproduced in connection with the report of A. H. Armstrong's New York Railroad Club paper published in the issue of this paper for March 23, 1918, page 561. For example, the pantograph is now shown mounted on the cab instead of the hood. More details of the knuckles connecting the central section of the cab with the other section are visible also.

The second illustration gives data regarding regeneration on the section of the electrified section between Three Forks and Butte. In this connection the authors say: "The amount of power returned to the trolley by regeneration varies with the amount of the grade and the type of train. On specific tests it has been shown that a train on a 2 per cent grade has regenerated 42 per cent of the power required to pull the same train up the grade. On a 1.66 per cent grade 23 per cent has been regenerated. The records for a particular month over the entire Rocky Mountain Division of the C. M. & St. P. for both freight and passenger trains show that the regeneration was equivalent to 11.3 per cent of the total power used."



PARTIAL ELEVATION OF 265-TON PASSENGER LOCOMOTIVE UNDER CONSTRUCTION FOR C., M. & ST. P. RAILWAY—CASCADE ELECTRIFICATION

# Advantages of Service-at-Cost*

### Plan Is Desirable Through Equitable Adjustment of Fares and Service—It Removes Antagonism and Fosters Co-operation

BY HARLOW C. CLARK
American Electric Railway Association.

THE laws of New York State as they now exist have taken away from the cities the right of regulation and control and the spectacle is presented of the largest state in the Union adrift on a sea of uncertainty and absolute inefficiency insofar as the control and regulation of one of the semi-public enterprises most important to the welfare, health and comfort and convenience of its citizens is concerned. The situation is one that is intolerable alike to the communities and to the investors. It is one that must be speedily corrected if the onward march of the Empire State is not to be halted.

In seeking the way out, it is necessary first of all to have a clear conception of the service and the duty that an electric railway performs. Street, interurban and suburban railway transportation is first of all a community function. As I conceive it, the only reason why it should not be performed by the community itself, acting through its corporate organization, is that it can be better and more efficiently and more economically performed by private enterprise.

I am not going to enter upon a discussion of the advantages and disadvantages of municipal ownership. It may be that in the halcyon days that are always before us, our form of government will so improve and develop that it will be capable of performing every service for its citizens better than similar service could be performed by private enterprise. There is nothing, however, in the history of our national, state or city government to indicate that so far in its history it has ever been as efficient and as economical as private enterprise, or most important of all—that it has ever brought to the conduct of such enterprises the initiative that has placed America in the forefront of the nations in everything that pertains to the physical welfare of its people.

Moreover, as far as the State of New York is concerned, the discussion of public ownership as affecting lectric railways is, I think, academic. There is said o be no city in the State which is in a position, under he bonding limitations of the State Constitution, to urchase its electric railway system.

## IMPORTANT ELEMENTS OF COST

If we are not to have government operation of our lectric railway systems, what then? It seems to me hat we should seek to secure the advantages of private nterprise and initiative to get for the communities he best possible service, at the lowest possible cost.

There are several things that the public requires of orporations which it calls upon to perform public ervice for it. First of all it requires their money, ot only that amount which covers the initial cost, but continuous flow of money to develop, improve and xtend the enterprise. It also requires their skill, their nowledge, their experience and their efficiency. These must pay for, and the rate that must be paid decreases the assurance of a proper return increases.

In addition to this assured return, which is capital's wage, there must be, if the public is to receive the best that is in the men who carry on their public service, some additional incentive for the exercise to the fullest of those qualities which give private management its value. I am not yet enough of an optimist to believe that the necessity of reward, to induce initiative and care and hard work and deep thinking in the management of business, is no longer with us.

These two elements of cost—the return to capital and the reward for initiative—are the only two which result from private operation and ownership, and the first does so only as the return demanded upon private investment differs from the return demanded upon public investment. Every other cost, with the single exception of taxes, is unaffected by the kind of ownership and operation under which an electric railway is conducted. These other elements are operating expenses, taxes, depreciation and maintenance. There is no virtue in public ownership or operation which can eliminate any of these costs except taxes.

It is evident that the money to pay these costs can come from but two sources—either from the car rider, who receives the service, or from the taxpayer. The policy of state subsidization of public utilities is even now being advocated, and more than that is actually in practice in Massachusetts. I doubt, however, whether this paternalistic policy will generally appeal to the American people.

Hence, if we are to have the "best possible service at the lowest possible cost," it is necessary that the fares shall vary as the cost of furnishing the service varies. It is perfectly evident that a fixed fare will, over any considerable length of time, be either too much or too little. What we must have is a fare that will readily and easily respond to the changes in the cost of the service demanded. This flexible relation between cost and price is what prevails in every other industry. The tax levies of cities change from time to time as the expense of administration changes. If, then, we are to adopt for the business of furnishing public service the same natural economic laws that apply to all other enterprise, we must have a flexible fare.

The next most important step is to determine the kind, character and extent of the service to be furnished. That I consider to be a direct function of the public itself, for it is a matter that depends upon the price. It should be the privilege of the public to specify the service required, and it should be the duty of the company to furnish it, as long as it is possible to furnish it for the fare received.

We must remember, however, that it is to the interest of both the public and company that fares be as low as is consistent with good service. One of the great advantages of the plan I am outlining is that it tends to bring about a spirit of co-operation between the company and the public that results in low fares. There is but one alternative to high fares under existing conditions, *i.e.*, extreme economy in operation, and this economy cannot be secured without the support and assistance of the public.

The advent of the automobile has made a great change in the conditions under which electric railways are being operated. It is very evident that a large part of the field formerly occupied by the electric railway has been invaded by this new form of transportation, which is furnishing a kind of competition that cannot be gotten rid of. It seems to me that what is immediately needed is a survey of the situation in each city, in order to ascertain how the service performed by the electric railways can be so readjusted as to eliminate all that is no longer necessary. It is certainly true that most electric railway systems are now furnishing service that is both unwarranted and unnecessary, and that they are being compelled by regulatory commissions and by public opinion to pursue many practices and methods which could and would be done away with if the public realized how important an effect they had upon the cost of operation and consequently upon the fare.

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*Abstract of address before New York State Conference of ayors at Schenectady, N. Y., June 11, 1919.

There are in addition many operating economies that could profitably be introduced, if the public was convinced that it was in the interest of low rates and good service. Among these are the one-man car, turnbacks, increased speed, and the enforcement of traffic regulations which would better protect the schedules.

### SUMMARY OF SERVICE-AT-COST PLAN

The service-at-cost plan proposes the following:

1. That private individuals and corporations shall act as the agents of the public in providing electric railway service.
2. That such agents shall receive for their services (a) such a rate of interest upon their investment in the property used and useful in serving the public as will attract capital into the business, and (b) an additional compensation as a reward for initiative, to be measured by the economy and efficiency manifested in the management.
3. That the degree to which the electric railway system shall be called upon to bear public taxes and imposts be determined in the light of fairness and justice as between the tax-payer and the car rider against whom such imposts are directly levied.
4. That the cost of operating the property shall be borne by the persons receiving the service, through a system of fares so adjusted as to respond to the variations in costs.
5. That the public, under such a system of fares as will provide the cost of whatever service is required, shall prescribe the service to be furnished.
6. That because under the plan proposed the rate of fare will largely depend upon the economy and efficiency with which the property is operated, the co-operation of the public in the elimination of unnecessary service and in the introduction of all proper operation economies be enlisted.

I greatly doubt that any intelligent, honest and well-informed body of men seeking a solution of the problem of the traction interests will very far depart from these principles. Their soundness is, as I see it, unaffected by any considerations of state or local control, or of varying systems of fares and fare collection. They can be applied through public service commissions or municipal directors, and they function as well if fares be measured by the distance the passengers are transported as if flat rates are in effect.

If they are to be applied to existing situations in communities already served by electric railway systems created under the old theory of the relations between municipalities and transportation utilities, a valuation of the property of the companies is a necessity. I see no unsurmountable obstacle in such valuation. I do not believe that any inflexible formula has yet been arrived at by courts and commissions by which the value of any particular property can be determined in justice to everyone concerned. The history of each company must be taken into consideration. I do believe that it is possible for reasonable men, even though their interests may seem to be opposed, to get together and arrive at an honest conclusion. In six cities in which service-at-cost agreements are now in effect valuations have been reached, and each valuation made has made the next one easier.

I conceive the merits of service-at-cost to be these:

That it establishes a method by which the price of electric railway service may be brought into correct relation with its cost.

That it is applicable to all methods of operation and control, whether by public or private corporations or under state or local regulation.

That it permits the public to specify the kind and the extent of service to be furnished.

That it is applicable to any system of charging, either by distance, by zones or by a flat rate.

That it induces co-operation between the public and the management in securing economical and efficient management.

That it removes the antagonism between the public and the corporations furnishing them transportation service.

That it establishes the transportation utilities as agents of the public, performing for the public a public service and receiving therefor a reasonable, a sufficient and an assured return.

I have no fear for the future of the electric railway industry. It is gradually adjusting itself to the higher price level, which we all know is upon us to remain. Undoubtedly fares will be higher than before, but the ability of the citizen to pay them has increased. Considered in terms of the average income, the fares will never, in my opinion, take from the patron so large a portion of his income as did the 5-cent fare when it was first established.

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# Solving the Traction Problem

## The Problem from the Public Point of View Demands a Solution in the Form of Public Ownership Based on a Conservative Valuation

DELOS F. WILCOX, at the New York State conference of mayors at Schenectady on June 11, urged municipal ownership as the real solution of the present electric railway situation, and he favored action by the next Legislature in New York. He declared, however, that valuation is the crucial point, for municipal ownership cannot afford to start off under the handicap of an excessive purchase price. As regards financing, Dr. Wilcox referred to the method followed in Seattle by which the municipal railway bonds were made a first lien upon the gross earnings of the railway. He thought that this might offer a way of handling the financial problem in New York.

### ELEMENTS OF THE COST OF SERVICE

In opening his remarks Dr. Wilcox analyzed the cost of service under (a) operating expenses, (b) accruing depreciation, (c) taxes and (d) return on investment. Under the first head he said that the public has a right to demand efficient management, which should include the taking advantage of progress in the art to reduce the operating costs now chargeable to unnecessary trackage, uneconomical routing, over-heavy cars, over-consumption of power and waste of platform labor. As for depreciation, he said that this had been too much neglected by over-optimistic managers, and that a correct policy should now be followed. This will have a tendency to increase the recognized cost of service and emphasize the demand for larger revenues.

Large taxes on electric railways were assessed because of the exaggerated ideas of the excess profits of electric railways, and budget makers for city and state have come to depend on them. In many cases the taxes have borne no direct relation to the profitableness of the industry and therefore are very little affected by a decrease in revenues or by an increase in operating expenses. A proper means of reducing the outgo in the case of hard-pressed electric railways, in the speaker's opinion, would be the reduction or the complete elimination of the special taxes and charges which have been levied against them in the days of their assumed or real prosperity. But this method of granting relief should not be adopted unless the companies demonstrate their good faith and efficiency by making use of all reasonable methods for the reduction of operating expenses.

The cost of capital, said Dr. Wilcox, has increased largely because the margin of safety, that is, the percentage of a company's income remaining after the payment of fixed charges, has decreased. But this decrease in the margin of safety, in the speaker's opinion, has been due largely to over-capitalization and the consequent inability of companies to sell common stock. Apologists for electric railways protest that the sins of the predecessor managements are now outlawed, but the trouble is that obligations rashly assumed will not cease to torment a man or a company until they are either repudiated or paid.

In regard to the general condition of electric railway finance, Dr. Wilcox said in part:

> Electric railway finance must be put upon a sound conservative basis. I say this knowing full well that in most cases the remedy proposed cannot be voluntarily accepted by the electric railway managers, directors and lawyers, who are in nominal control of the properties and the policies. These men frequently represent a narrow marginal interest that is threatened with extinction whenever earnings fall or expenses rise. Nevertheless, this marginal interest includes practically the entire group of active men whom we see and negotiate with as the operators and nominal owners of the electric railways. To them it is a matter of life or death to maintain their narrow footing and retain their jobs and their power.
>
> When the prices of materials increase so that it is almost impossible for an electric railway to earn a moderate return on a conservative investment at any rates that may be charged, these men seize upon this condition to assert that it has doubled the value of their property. They recognize perfectly that the fundamental fact of importance to them from the point of view of their private interest is the valuation. If they can get a high enough value recognized, then public service commissions will be impotent to control rates or to compel radical improvements in service. If they can get a value fixed that makes electric railway operations appear unprofitable, then they can forestall municipal ownership by putting it under an initial handicap that could not be overcome for many years, if ever.
>
> The foundation of the structure of electric railway investments in this country is rotten, and this is one of the fundamental reasons why the business has been unable to weather the storm of war times. I do not say that this is the only reason, but I do say that no plan which calls upon the public to pour more revenues and still more into the coffers of the electric railways will result in putting them on their feet financially without wrecking them as public utilities, unless this rotten financial foundation is removed and the whole structure rebuilt on a sound basis.
>
> I gravely doubt the possibility of getting the electric railway business upon a sound basis with its own consent. It eels itself desperately sick and would like to be cured, but pparently it prefers death to castor oil. I do not anticiate that the committees of the American Electric Railway Association and the United States Chamber of Commerce, or even the new federal advisory commission, will get very far in helping the bankrupt companies, unless they prescribe a disagreeable remedy.

Dr. Wilcox then took up the question of who is to pay the cost of service, mentioning the following points that require consideration: Is it to be the largest number of persons who can be persuaded by low fares and good service to avail themselves of electric railway facilities? Or is it to be the residual number of street car patrons who cannot be driven away by high fares and inconvenient service? Or is it to be the people who can be arrested and compelled to ride in street cars even though, at the price charged, they would prefer to walk, take a jitney or buy a Ford? Or shall a levy be made on the land owners for a share of the cost, and people be taxed because they could ride but do not?

In connection with the various aspects of this matter of paying for service, Dr. Wilcox said in part:

> American zoning experiments do not look to a decrease in the fares below the old 5-cent unit, even to the short rider, and so far as these zoning plans have been put into effect and so far as the results of proposed zoning plans have been forecast by the companies, they have been attended or will be attended by a decrease in traffic resulting from the increase in fares. The electric railway companies in this country have been flirting with permanent ruin by the pursuit of a rate policy that tends to diminish their usefulness as a public utility by driving away traffic, particularly that portion of it which is from the financial point of view most profitable to the carriers.
>
> It seems clear that there is little chance of reaching an agreement with the electric railways by which they will accept as the cost of service a figure that we can afford to pay. At least matters have come to such a pass that in many cases we cannot afford to saddle upon the car riders the full cost of service as measured by the demands of private ownership and operation. But with public operation for the benefit of the private owners, after the Massachusetts plan, or with subsidies out of taxation to make up for deficiencies in revenue where rates are kept down to the level which the general welfare of the community demands, we get into a realm of uncertainty and danger that ought to be avoided if possible. To make a service-at-cost plan effective under private management requires a persistent application of public intelligence and public will that is just as difficult as efficiency in direct public operation. It can hardly be doubted that the Cleveland plan has worked more satisfactorily than any other plan of private operation which has been tried in connection with any important electric railway system in this country, but Cleveland has its troubles, and the agitation for municipal ownership seems to be just as keen there as it is in other American cities. The case for public ownership and operation rests squarely upon the premise that the function of local transportation is public business.

Despite the legal and financial difficulties involved, Dr. Wilcox believed that until the cities adopted a definite program for definite action toward the municipalization of utilities, very little progress toward a solution of the electric railway problem would be made. He did not hesitate to blame the cities, and more particularly the mayors and other officials, for the negligence which has been displayed by them with respect to the electric railway problem. It is their narrowness of vision, their lack of initiative, their unwillingness to tackle big public jobs or to assume big responsibilities, that have kept cities in a condition of unreadiness and impotence. Yet the traction problem is the cities' problem.

In conclusion, Dr. Wilcox urged the passage of municipal ownership legislation that can and will be used. To his mind, one of the most important things in this connection is that the law shall leave a city free to initiate and carry through a municipal ownership policy without having to come to an agreement with the existing company as to how or when the policy is to be put into effect, or as to the price to be paid for the company's plant. There is needed an adequate public utility condemnation law so drawn as to protect the cities from having to pay an exorbitant price for property already devoted to the public service, merely because it is being taken from its private owner to be continued in the same service under more responsible management. In short, he declared, the crux of the traction problem is the valuation.

# Safety Car and Public Ownership Discussed

### Properly Devised Service-at-Cost Franchise Might Serve for Present, Says Dr. Wilcox—Local Chambers of Commerce Being Canvassed

THE public utilities committee of the Chamber of Commerce of the United States held its third hearing in Washington, D. C., on June 13 in regard to the electric railway situation. The main speakers were Henry G. Bradlee, Stone & Webster management corporation, and Delos F. Wilcox, consulting franchise expert, New York, N. Y., their subjects being respectively the one-man safety car and the general problem of the electric railway industry.

Mr. Bradlee, after describing the origin and the development of the safety car, directed attention to the three savings in wages, power and maintenance costs and to the increases in revenue from the greater service and riding that go with the use of this car. Mr. Bradlee stated that in general Stone & Webster find motor buses more expensive than the light-weight safety cars for heavy traffic; but sometimes because of the smaller investment required it is better to try buses during the test period in opening up new territory. As for the conversion of old cars, he declared that this would result substantially in only labor saving, with no benefit to the public through increased service.

Mr. Bradlee said that Stone & Webster companies have shown decreases in the number and the cost of accidents since the adoption of safety cars. In regard to employees, he averred that no man has been dropped because of one-man operation, for the increased service given with the safety cars and the very heavy labor turnover in the electric railway industry have enabled the companies to take care of all the old employees, new men not being taken on quite so fast for a short time.

In Dr. Wilcox's opinion, the present electric railway situation is due partly to financial policies voluntarily pursued by the companies, partly to restrictions imposed by the public and partly to economic changes. In connection with the first item he criticized the tendency of companies to neglect depreciation provisions and to be forever pushing for a bigger capitalization or a bigger capital value. In most cases, he admitted, electric railways are not receiving a fair return upon a conservative valuation of the property in public use. Even with such a fair return, however, the fixed charges in many cases could not be paid and sufficient margin for stock be left to attract new capital for development.

Under the heading of public restrictions Dr. Wilcox placed the fixed fare and tax burdens. He favored a flexible fare except in cases where the public policy of the community requires a certain fare for the sake of city development, it being understood that the full cost of service must be paid in some way. Likewise he favored reduced or eliminated taxes where they do not constitute a proper part of the cost of service. In so far as the paving tax is legitimately created by car operation, it should be charged against the railway, but in so far as it is simply a relic of past days and not related to present operation, it should be abolished. The replacement of paving after track repairs is a proper charge against the railway.

In the face of existing conditions, Mr. Wilcox thought that the only way out would be through public ownership. The tendency is toward a greater recognition of electric railway operation as a public business and a greater public control thereover, and the world does not move backward. There is a great movement in favor of service-at-cost resettlements, but such arrangements have the disadvantage of being indirect. Dr. Wilcox admitted, however, that public opinion is divided on the question of the advisability of municipal ownership and also that much time would be required to straighten out existing legislation so as to make such ownership possible.

In response to a query from P. H. Gadsden, as to whether efforts should not be made to scrap existing franchises and secure universal acceptance of new service-at-cost franchises based on fair valuations with the right of municipal purchase when the cities should secure the power, Dr. Wilcox agreed that such a general plan would help to steady the situation. Moreover, it would be a good permanent policy as regards preparation for an ultimate decision either way on the question of municipal ownership. Dr. Wilcox made the reservation, however, that the service-at-cost franchises must have satisfactory safeguards in relation to the purchase price of the property, an amortization process if the city so desired, and control over fares and extensions. He deplored the fact that no general authority exists for finding fair values and making both sides accept them, for the extravagant claims made when valuations are handled by direct negotiation militate against speedy settlements.

The members of the public utilities committee present were Lewis E. Pierson, New York, N. Y., chairman; P. H. Gadsden, Philadelphia, Pa.; E. K. Hall, New York, N. Y.; F. B. DeBerard, New York, N. Y.; A. W. Harris, Chicago, Ill.; Henry G. Bradlee, Boston, Mass.; H. L. McCune, Kansas City, Mo., and C. L. Harrison, Cincinnati, Ohio. Royal Meeker, commissioner of the bureau of labor statistics, who with Mr. Gadsden is a member of the recently created Federal Electric Railways Commission, also attended. Mr. Gadsden explained the proposed work of the federal body, and the public utilities committee expressed itself in favor of full co-operation.

#### LETTER SENT TO LOCAL CHAMBER

In order to add to the data already secured at hearings, the public utilities committee on June 11 sent to local chambers of commerce throughout the United States a letter asking for information concerning the local transportation situation in the larger cities. The letter was in part as follows:

> The committee on public utilities of the Chamber of Commerce of the United States has been so deeply impressed by the extent and gravity of the financial condition of street railways everywhere that it plans to make a report as soon as possible upon this national problem.
>
> Everyone agrees that the actual solution of each separate situation must be made by the official representatives of the community concerned, but certain general principles are common to all cases and the problem is of vital importance in its relation to the home owner, the manufacturer, the merchant, and business and social welfare generally. The problem is essentially a business problem, and it will not be well solved unless the representative business men of every city give it careful study and consideration and tender their best judgment and advice.
>
> In order to assure the compilation of a comprehensive report with practical and helpful recommendations, the national chamber's committee asks for the immediate co-operation of a committee of your organization and hopes that, if a proper committee is not already constituted, such a special committee may be appointed at once.

# Side Lights on the Fare Zone—Why Fare Stages Should Vary in Length

### It Is Better Business to Serve the Majority Than to Attempt to Give Exactly the Same Distance for a Given Fare

BY WALTER JACKSON

"WELL, here's another request from the Clamsboro Commercial club to extend Zone 18 another 800 ft. That means the northbound riders could reach the Clamsboro stores without paying an additional fare. No wonder the Club members are united on this. What do you think we ought to do?"

"Why give it to 'em and thank the club for the tip. In trying to sell more of their merchandise, they are trying to show you how to sell more of yours."

"I can't see it that way at all. Seems to me we're expected to give another 800 ft. when we can hardly break even now. According to our latest survey, it costs just 4.76108 cents to carry a passenger through that zone. Give him another 800 ft. and we're busted good and plenty."

"Now, old man, let's forget those laboratory decimals for a minute and get down to hard pan. How much money are you getting from passengers who are sporty enough to pay another nickel for the sake of riding that 800 ft.?"

"Not enough to choke the fare box or callouse the palms of the conductor. Fact is 'most everybody gets off and walks; and we don't get any thanks for giving them the exercise, either."

"So you're not getting the money after all?"

"Lord, no. But we've got to be consistent and have everybody pay exactly the same rate. It's beyond me why the public doesn't see that we are simply trying to be fair."

"Sure, you're trying to be fair. The only trouble is that you're standing so straight that you're falling over backward. By the way, if your northbound passengers to Clamsboro are left 800 ft. short of the stores, then your southbound passengers must be able to override by the same distance."

"They can, but they don't. It's only a theoretical advantage. No reason, you know, why they should, because most of them are out to shop in Clamsboro and the rest are going through to other zones."

"I see. So if you shortened the zone of southbound riders by this 800 ft., nobody would start talking about discrimination, huh?"

"Nobody I can think of."

"And, on the other hand, it's pretty certain that none of your northbound riders are going to kick if you give them an additional 800 ft."

"You bet they wouldn't, as that's just what they have been after for years. But, as I said before, we can't afford it."

"What d'you mean, can't afford it? You just said that practically nobody paid that additional fare. Chances are that if you do extend that zone you'll make lot more than at present."

"Give more and get more? How come, how come?"

"Why, because you will be taking the passengers xactly to the place they want to get to without creatng the feeling that the railway is trying to do them. They won't care a peanut shell if you give them 1.843 miles for a nickel in one place and 2.41144 miles in another provided you land 'em in the jazz part of town instead of half way down the cemetery. If you must shorten the zone, cut back far enough to make walking out of the question. When I say you'll make more money by giving that extra 800 ft., I mean that people will ride oftener because your service will no longer be associated with any annoyances or hardships. These business men are right. They know that if the customer carries away pleasant associations he, or more often she, comes again. Who knows how many times the nickels that you need went into telephone orders. And even if this extension doesn't bring you an extra penny directly, it will save you many a dollar in better public relations."

"You're right. There's merit in the idea of shortening or lengthening the stages from the point of view of the mass of our passengers. As you know, I was raised in the old 5-cent suburban school which let the stages come wherever the milestones happened to be. I guess we can put this common-sense way across with the public as long as the Public Service Commission can be induced to see that what looks like discrimination is really the squarest thing after all. If we please the bulk of our riders, we needn't worry about what the regulators and the courts may say about this departure from old practices."

# Supervision of Public Improvements

### Should Be Under Special Department, Not Army, Says Recent Protest

M. O. LEIGHTON, chairman national service committee of Engineering Council, acting as chairman of the Engineers, Architects and Constructors' Conference on National Public Works, has just addressed a strong protest to the chairman of the committee on commerce, United States Senate, on a bill to create an "auxiliary engineer corps" in the United States Army for duty on the works of public improvement. This bill was introduced June 5, 1919, by Senator Ransdell of Louisiana "by request."

Such a program, according to Mr. Leighton, is opposed by a great majority of the engineers, architects and constructors of the United States who are advocating instead the consolidation of the engineering and construction work of the government into a department of public works. The United States stands practically alone among the great and small nations of the world in that it has no such department, and a bill will be introduced in Congress in the near future for the creation of a department of public works. Mr. Leighton says in his letter to the chairman of the Senate Committee on Commerce that such a plan is far superior to that described in the bill mentioned which "is merely a part of a very ambitious plan to place the army in the saddle over all engineering operations of the government."

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The last section of the electric railway system encircling the city of Tokyo, Japan, was put in operation on March 1. A passenger may get on at any point of the circle, and alight at any other point on the route. A part of the circle passes through the busy part of the city as an elevated railway. The system belongs to the Imperial Government Railways, and constitutes an important adjunct to the main railway system.

# Committee of One-Hundred

## List of Those Appointed to Assist in Presenting the Electric Railway Case Before the Federal Electric Railways Commission

PRESIDENT PARDEE of the American Electric Railway Association announced on June 19 that the committee of 100 was nearly complete. The membership on that day is given in the list below. There remain only nine appointments to be made.

MILTON E. AILES, Vice-President Riggs National Bank, Washington

H. M. ATKINSON, Director Georgia Railway & Power Company, Atlanta

FRANK BACKUS, Vice-President American Steel & Wire Company, Worcester

JULIAN M. BAMBERGER, President Bamberger Electric Railroad Company, Salt Lake City

S. R. BERTRON, Director United Gas & Electric Engineering Corporation, New York

HENRY A. BLAIR, Chairman Board of Directors, Chicago Surface Lines, Chicago

CHARLES BOETTCHER, Chairman Board of Directors, Denver Tramway Company, Denver

NICHOLAS F. BRADY, President New York Edison Company, New York

FRANK W. BROOKS, President Detroit United Railway, Detroit

BRITTON I. BUDD, President Metropolitan West Side Elevated Railway, Chicago

H. M. BYLLESBY, President H. M. Byllesby Company, Chicago

CLARENCE M. CLARK, President E. W. Clark Management Corporation, Philadelphia

EMERY W. CLARK, President First Old National Bank, Detroit

E. G. CONNETTE, President International Railway, Buffalo

NORMAN McD. CRAWFORD, Vice-President Columbus Railway, Power & Light Company, Columbus, Ohio

THOMAS A. CROSS, President United Railways & Electric Company, Baltimore

GERHARD M. DAHL, Vice-President Chase National Bank, New York

ARTHUR V. DAVIS, President Aluminum Company of America, Pittsburgh

MOREAU DELANO Brown Brothers, New York

A. C. DINKEY, President Midvale Steel Company, Philadelphia

HENRY L. DOHERTY, President Henry L. Dohertv & Company, New York

WALLACE B. DONHAM, Vice-President Old Colony Trust Company, Boston

R. J. DUNHAM, Vice-President Armour & Company, Chicago

VAN HORN ELY, President American Railway, Philadelphia

WALTER F. FIELD, Vice-President Philipps Insulated Wire Company, Providence

HENRY FLOWERS, President Fidelity National Bank & Trust Company Kansas City

ALLEN B. FORBES President Harris, Forbes & Company, New York

FRANK R. FORD Ford, Bacon & Davis, New York

FREDERICK GOFF, President Cleveland Trust Company, Cleveland

FRANKLIN T. GRIFFITH, President Portland Railway, Light & Power Company Portland, Oregon

B. H. GRISWALD, Jr. Alexander Brown & Sons, Baltimore

W. F. HAM, President Washington Railway & Electric Company, Washington

GEORGE E. HAMILTON, President Capital Traction Company, Washington

OLE HANSON, Mayor. City of Seattle, Washington

C. H. HARVEY, President Knoxville Railway & Light Company, Knoxville

*Chairman*

GUY E. TRIPP

Westinghouse Electric & Manufacturing Company, New York

*Vice-Chairmen*

JOHN H. PARDEE

President American Electric Railway Association, New York

H. L. STUART

Halsey, Stuart & Company, Chicago

JAMES H. McGRAW

President, McGraw-Hill Company, New York

J. D. MORTIMER

President North American Company, New York

PHILIP J. KEALY

President, Kansas City Railway, Kansas City

THOMAS N. McCARTER

President Public Service Railway, Newark, N. J.

A. W. BRADY

President Union Traction Company of Indiana, Anderson

O. B. WILLCOX

Vice-President Bonbright & Company, New York

SAMUEL M. CURWEN

President J. G. Brill Company, Philadelphia

ANTON G. HODENPYL Hodenpyl, Hardy & Company, New York

SAMUEL INSULL, Chairman Board of Directors, Metropolitan West Side Elevated Railway, Chicago

A. B. LEACH, President A. B. Leach & Company, New York

ARTHUR W. LOASBY, President First Trust & Deposit Company, Syracuse

HOMER LORING, Chairman Public Trustees, Eastern Massachusetts Street Railway System, Boston

HORACE LOWRY, President Twin City Rapid Transit Company, Minneapolis

A. M. LYNN, President West Penn Railways, Pittsburgh

RICHARD McCULLOCH, President United Railways of St. Louis, St. Louis

WILLIAM B. McKINLEY, President Illinois Traction System, Peoria

SAMUELS McROBERTS, Executive Manager National City Bank, New York City

S. Z. MITCHELL, President Electric Bond & Share Company, New York

THOMAS E. MITTEN, President Philadelphia Rapid Transit Company, Philadelphia

RANDALL MORGAN, Vice-President United Gas & Improvement Company, Philadelphia

J. K. NEWMAN, Chairman of Executive Committee, American Cities Company, New Orleans

J. R. NUTT, President Citizens Savings & Trust Company, Cleveland

E. H. OUTERBRIDGE, President Pantasote Company, New York

J. S. PEVEAR, President Birmingham-Tide Water Railway, Birmingham

E. W. RICE, Jr., President General Electric Company, New York

EDWIN W. ROBERTSON, President Columbia Railway, Gas & Electric Company, Columbia

E. N. SANDERSON Sanderson & Porter, New York

W. KESLEY SCHOEPF, President Cincinnati Traction Company, Cincinnati

J. N. SHANNAHAN, President Newport News & Hampton Railway, Gas & Electric Company, Hampton

THEODORE P. SHONTS, President Interborough Rapid Transit Company, New York

PAUL SHOUP, President Pacific Electric Railway, Los Angeles

FRANCIS H. SISSON, Vice-President Guaranty Trust Company, New York

CLEMENT C. SMITH, President Wisconsin Securities Company, Milwaukee

JOHN J. STANLEY, President Cleveland Railway, Cleveland

CHARLES A. STONE Stone & Webster, Boston

J. J. STORROW Lee, Higginson & Company, Boston

LUCIUS S. STORRS, President The Connecticut Company, New Haven

EDWARD T. STOTESBURY J. P. Morgan & Company, Philadelphia

J. F. STRICKLAND, President Dallas Railway, Dallas

KNOX TAYLOR, President Taylor-Wharton Iron & Steel Company, High Bridge, N. J.

A. W. THOMPSON, Federal Manager Baltimore & Ohio Railroad, Baltimore

W. B. TUTTLE, First Vice-President San Antonio Public Service Company, San Antonio

T. H. TUTWILER, President Memphis Street Railway, Memphis

WILLIAM VON PHUL, Vice-President United Railroads of San Francisco

G. W. WATTLES, Vice-President Omaha & Council Bluffs Street Railway, Omaha

H. H. WESTINGHOUSE, Chairman Board, Westinghouse Traction Brake Company, New York

THOMAS N. WHEELWRIGHT, President Virginia Railway & Power Company, Richmond

JAMES G. WHITE, President J. G. White & Company, New York

HARRISON WILLIAMS 60 Broadway, New York

TIMOTHY S. WILLIAMS, President Brooklyn Rapid Transit Subsidiary Companies, Brooklyn

GEORGE T. WILSON, Vice-President Equitable Life Assurance Company, New York

J. H. WILSON, President Mobile Light & Railroad Company, Mobile

O. D. YOUNG, Vice-President General Electric Company, New York

# Federal Investigation Opens in New York

## Ex-President Taft, as First Witness, Says that Public Antagonism Must Be Removed to Get Industry Out of Discouraging Situation

THE Federal Electric Railways Commission, recently appointed by President Wilson to investigate the general electric railway situation, began its public hearings with a session on June 19 in New York City. The chief witnesses were ex-President William H. Taft and John H. Pardee, president American Electric Railway Association.

Mr. Taft began with a recital of the work of the National War Labor Board, of which he is joint-chairman, in its efforts to insure maximum production during war time. He has concluded, from his experience, that the restricted financial condition of electric railways in the past kept wages down below what they should have been. The board early decided that in determining wages it would be inequitable to consider, as a basis, the companies' ability to pay, but it recommended that the companies be allowed increased revenues. The board frequently met with response on the part of state authorities, but upon local councils and referendum voters the recommendation had no more effect than if it had been written in water.

The War Labor Board at first recommended the appointment of a federal commission with control over rates, it being Mr. Taft's view that it was within the constitutional power of Congress to give the President authority to grant rate relief to needy electric railways in war time. The recommendation was not accepted, and now the near-peace situation does not justify legislation to this end. In reply to queries as to what the present commission can do, however, Mr. Taft declared that its duty is to get the facts from all interests concerned and to make findings thereon. Such findings, in his opinion, will have a strong moral effect throughout the country. He particularly thought that the commission should receive evidence as to the exact situation in individual localities but that no decision or suggestion as to the settlement of local questions should be made unless the dispute was voluntarily submitted by both parties and the commission deemed it wise to act.

### THE INDUSTRY NEEDS HELP

The general situation in the electric railway industry, Mr. Taft said, is most discouraging. As factors in the situation he mentioned the expansion of the systems, the growth of automobile competition, high war costs and, in some cases, public belief in past corruption and over-capitalization. In his opinion, however, the advantages which some railways secured through sinister means in the early days have been more than offset by the injustices later inflicted by the public in a desire for revenge.

The fixed 5-cent fare has been another handicap. Some of the public evidently believe that this fare is guaranteed to them by the Constitution and look upon an increase as the grant of an outrageous profit to the investors. As a matter of fact, Mr. Taft stated, a fixed fare in the long run is not just for either side, and the public should consider that the purchasing power of the nickel has greatly declined in recent years. The difficulty with increasing fares, however, is that higher fares cause reduction of traffic. A railway rate increase, which may be paid eight or ten times a day by a family, is much more irritating than other utility increases payable monthly.

### COSTS ARE NOT GOING DOWN

The electric railway industry, Mr. Taft said, was established on the basis of a cheap fare and cheap labor and materials. It was never contemplated that the 5-cent fare would be sufficient to bear the burdens of present-day operation. It is true that the War Labor Board did not deem it wise to fix a general minimum wage, and that the basic wages from 36 to 42 cents in various cases, according to living costs, were only temporary adjustments for six months or during the period of the war. Nevertheless, Mr. Taft asserted, the awards made have established a more or less permanent higher standard of wages, and there is not a bit of doubt that the operating expenses of electric railways will remain on a high level. If he were a member of the federal commission, trying to formulate a suggestion for a permanent solution, he would advocate the commission's addressing itself to the public upon the basis of present prices being the normal ones for the future.

### SUGGESTIONS FOR IMPROVEMENT

In the course of his replies to various queries, Mr. Taft touched upon several points relating to improvement of the situation. In order to overcome public prejudice on the ground of financial history, it will be necessary to ascertain the real investment in the properties. Upon this an adequate return must be allowed if the credit of the industry is to be restored. As in many cases in recent years, commission approval should be required for the issuance of new securities. Electric railways should not be required to pay taxes under any other rule that that applying to other forms of invested capital. Furthermore, the companies should be so reorganized as to have power to give up unprofitable lines that should never have been built.

As for fares, Mr. Taft felt that any fare above 7 cents was sure to cause a loss of business. The zoning system, in his opinion, should be tried more than it has been, for the flat-fare system, adopted mainly for convenience, has not produced the results expected. In the zoning system there should be a charge to encourage the short-haul rider, and the minimum might be below 5 cents.

If increased fares leave a deficit which must be met through taxation, the public will naturally take over control of the management. Mr. Taft's belief in the reduced economy of public operation, however, made him hope for the continuation of private operation. The service-at-cost plan is theoretically just, but its practical workings in the various cities should be studied. While the incentive to efficiency and economy may not be so strong under service-at-cost as under private operation, there is still enough motive, in the absence of an absolute guarantee of return, to make the management more economical than under public operation. In Mr. Taft's opinion, service-at-cost franchises would allay rather than strengthen the demand for public ownership. It would not be practicable to have all franchises converted at once to the service-at-cost plan, but the success of such franchises in one state would be likely to lead eventually to uniformity throughout the country.

Lastly, Mr. Taft suggested that in trying to devise a permanent solution of the electric railway problem the federal commission should not seek to fix exact terms but should outline equitable principles and leave the working out of details to public bodies. As to whether such bodies, for the exercise of control over rates and service, should consist of state commissions or city councils, he believed that the more practicable plan would be to give complete control to the state bodies. In view of the strong desire of people for local regulation, however, and the fact that a certain amount of initial supervision by the cities might help to reconcile them to state control without sacrificing too much speed and efficiency, it might be wise to allow the cities thus to participate. State commissions are better qualified to make all final decisions, and matters of rates and service should not be left to the cities without appeal to the commissions.

### RAILWAYS OFFER AID

Mr. Pardee stated that at a recent meeting of the executive committee of the American Electric Railway Association a committee of one hundred of the leading owners, operators, bankers and others was appointed to prepare a presentation of the situation as it is viewed by the electric railway interests. A meeting has been called for June 26 in New York, and sub-committees are working out a definite plan which it is hoped will be adopted then. A week later, Mr. Pardee thought, the committee could make its first report, the idea being to present different phases of the situation one at a time. In reply to a query as to whether or not the committee would desire a three or four-day session for the presentation of all its data, Mr. Pardee said that some parts of its work would require more time than others but that such a general session might be possible at a later date.

### COMMISSION ASKS FOR LARGER APPROPRIATION

Gaylord C. Cummin, consulting engineer, New York, at one time city manager of Grand Rapids, Mich., and also of Jackson, Mich., was the only witness on Thursday afternoon. He divided electric railways into two groups, those which had an earning capacity sufficient to pay their way and those which did not. For the latter group, where they were a public necessity, he saw no future except with a subsidy. Most roads belong to the former group. He considered no form of franchise universally satisfactory, the best being service-at-cost. With such, however, there should be a sliding scale of return, the rate increasing when the fare decreased, so as to give an incentive to the company to economical operation and to the public to co-operate with the company. He thought that municipal operation should be considered only as a last resort as the public was a poor employer.

In referring to the extent of automobile competition he mentioned the gasless Sundays of last Autumn, when the traffic on several electric railways with which he was acquainted increased from 30 to 40 per cent. He considered electric railways should be relieved of burdens, like that of paving, which were not connected with railway operation. He believed the companies ready to adopt improvements conducive to economical operation, such as the one-man car under conditions for which it was suited, but pointed out that lack of credit often prevented action along these lines. He urged the re-establishment of credit as a primary step.

At the conclusion of Mr. Cummin's testimony Chairman Elmquist announced that the meeting was adjourned.

After the organization meeting, held in Washington, June 18, Chairman Elmquist gave out the following statement: "In order to handle the electric railway situation adequately and comprehensively the commission decided it would be necessary that more money be provided to carry out the program. We have therefore asked for an appropriation of $100,000 which will come before the Senate appropriations committee within the next few days. We have received a number of inquiries from various cities throughout the country presenting specific problems arising from the electric railway situation in those localities. We want to emphasize that the function of the commission is merely to investigate and recommend as regards the general situation, and it is not its purpose to advise on any specific situation that confronts a given community. The commission has not the facilities to do this and moreover it is necessary that both sides of the question be presented before a just and reliable recommendation can be made."

## Recovering Track Material in St. Louis

THE track yards of the United Railways of St. Louis are located adjoining the repair shops and general office of the company on Park Avenue where they occupy a tract of two city blocks. The property has a direct steam railroad connection so that heavy materials are easily received. In the yards at present the company is meeting with much success in making available for reuse a great deal of old track material, particularly screw spikes, joint plates, joint bolts and Nichols' joints. The means employed is the sand blast.

The screw spikes, when removed from old track, have usually parts of the old ties adhering to them, but a short treatment with the sand blast cleans them perfectly and after being dipped in oil they are ready to use again. Fish plates require no treatment other than the sand blast.

Nichols' joints are taken out of the track by cutting the rail on each side of the joint near the end of the plate. The plates are then taken into the yard and the rivets knocked out with a pneumatic hammer with a long stroke, called a pneumatic "gun." The spelter is easily knocked loose from the plates and is then ready for remelting.

The company tried various ways of operating the sand blast, particularly with bolts and screw spikes which are so small that they could not easily be set up against a board. Finally the best way was found to be to put the bolts and screws in the hoppers of some old dismantled wheelbarrows so that they roll around as the sand blast plays on them.

# Manganese Special Work Repaired by Welding

## The Method Used by the Montreal Tramways for Reclaiming and Repairing Cast Manganese Special Work Is Described and Some Figures for Savings Are Given

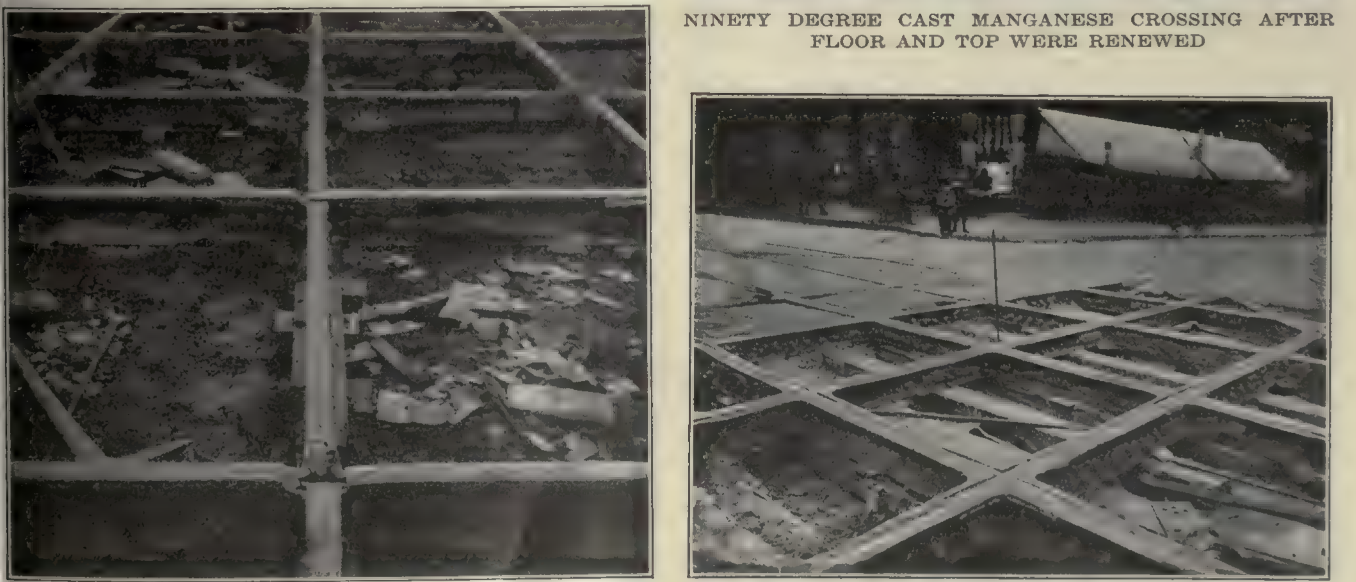
By JULIAN M. SCOTT
Superintendent of Tools and Machinery Montreal Tramways

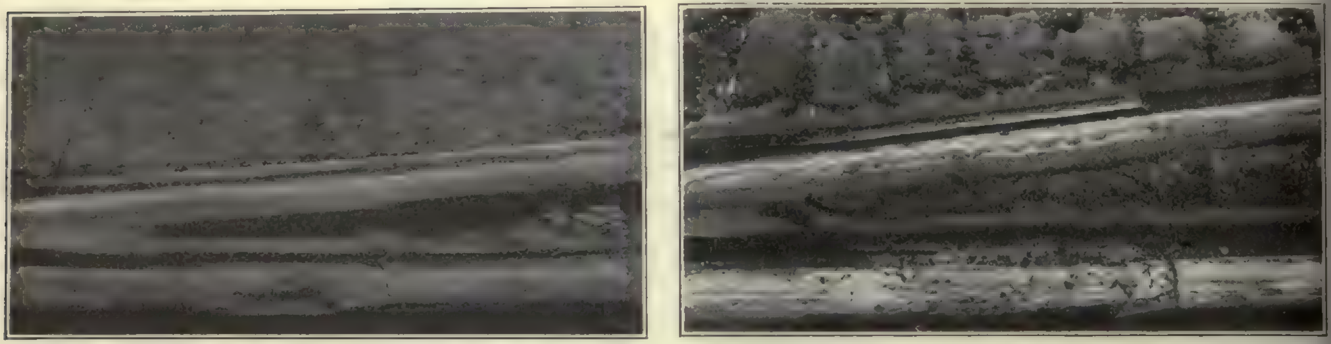
IN THE April 19, 1919, issue of the ELECTRIC RAILWAY JOURNAL an article appeared which dealt, in a general way, with the application of electric arc welding to track work, and included its use for manganese special work repairs. From this portion of the article, I would conclude that the author's experience with this class of work had been rather unfortunate and entirely contrary to results obtained by the Montreal tramways, where, with a few exceptions, all classes of worn and broken manganese special work are repaired with satisfactory results and with a large saving in labor and material.

An accompanying illustration shows a 90-deg. double-track cast-manganese crossing. This is one of our most important intersections and bears heavy traffic on both streets. In the fall of 1916 the diamonds of this crossing were practically worn out; all the floors were broken through and most of the corners missing. Our usual method of rebuilding floors and corners was applied and with a small amount of filling done periodically, this crossing will be kept in service until, at least, 1921. The serviceable condition of these diamonds is proved by the fact that our engineers consider them worth new foundation and paving this spring. For five

NINETY DEGREE DOUBLE TRACK CAST MANGANESE CROSSING

NINETY DEGREE CAST MANGANESE CROSSING AFTER FLOOR AND TOP WERE RENEWED


RECLAIMING RAIL DIAMONDS—AT LEFT, BEFORE REPAIR; AT RIGHT, READY FOR PAVING IN



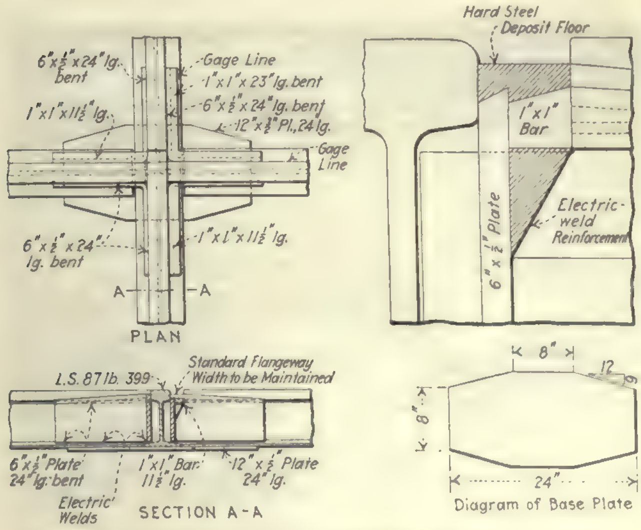
RECONSTRUCTING THE HEEL OF A DAMAGED MATE—AT LEFT, MATE WITH PIECE SHELLED OUT; AT RIGHT, REPAIRED MATE

years these repairs will have deferred an expenditure of $6,000 and made a net saving of $5,550 on interest and depreciation charges, at a cost of less than $200. A second illustration shows the condition of one of the corners of this crossing after having the entire floor and top renewed.

Another valuable and highly successful class of repair is that of replacing pieces broken from the tread and other portions of switches, mates, crosses, etc. In this same class might be included the building in of badly cupped ends on these same pieces. The heel of a perfectly good 115-lb. mate from which a large piece shelled out is shown on this page. Ordinarily this mate would have to be immediately scrapped, but in this case it was returned to full working life, as indicated in the next illustration.

The points of frogs and mates when worn short and off center are readily replaced. Switches and mates on which the bulk of the traffic takes the curve, become worn low on one side, causing derailments, etc. This trouble can be mitigated for a time by grinding, but before long the only cure is replacement. We remedy this trouble by building the tread up to the original height and shape.

To illustrate the saving, the following figures are an approximation of the value of such work to this road during 1918. All figures are based on the assumption that the life of each piece of special work is prolonged one year, thus deferring expenditures and earning the depreciation and interest charges. No allowance is made for pieces saved from the scrap pile and returned to remaining working life.



METHOD OF WELDING AND REINFORCING DIAMONDS

| | |
|---|---|
| 526 pieces of special work treated representing a value of........ | $159,000.00 |
| Interest for one year on the deferred investment at 6 per cent.... | $9,540.00 |
| Depreciation at 12½ per cent per year........................ | $19,875.00 |
| | $29,415.00 |
| Total cost of the work—all charges included.................. | $1,200.00 |
| Saving effected........................................ | $28,215.00 |

This is a very substantial saving and proves beyond question the value of repairing special work.

Special work of the hard-center type is treated in exactly the same manner and with equally satisfactory results. Our method and materials are of the simplest. When building in large breaks or holes, the first material used is bare ⅛-in. round common mild steel electrodes. The wearing top is built on with bare ⅛-in. round electrodes of low-grade tool steel having a carbon content of 0.85 to 0.95, which has proved to be good material at a reasonable price. The current is kept at the lowest point which will give proper fusion, and is about 140 amp. at 30 to 40 volts across the arc. No welding operations are ever carried on at 250 volts, and the standard resistance welders deliver about 70 volts, which will give 35 to 40 volts across the arc.

We are at present reclaiming and adding floors to some 87-lb. built-up high T-rail diamonds by a method which has proved satisfactory. The rail is fairly good, but the rail ends and connections are bad.

The last two illustrations show portions of the diamond before and after repair, and the sketch details the method. The total cost of this intersection reclaimed, amounts to $500.

## Keeping Down Air Resistance of Trains

In view of the progress made in aeronautics during recent years a writer in the *Engineer*, London, considers timely the renewal of interest in reducing the resistance met by trains in their passage through the air. He calls attention to the law that the power required to force a flat transverse surface through the air is, in horse-power per square foot, approximately 6 millionths of the cube of the velocity in miles per hour. Every square foot of transverse surface, then, requires about ½ hp. at 43 m.p.h., 1 hp. at 55 m.p.h., 2 hp. at 70 m.p.h., and 3 hp. at 80 m.p.h.

The article referred to quotes from the report of the Electric Railway Test Commission, based on work done at the Louisiana Purchase Exposition and elsewhere, relative to the importance of so shaping high-speed cars as to reduce the resistance to an economic minimum.

The leading editorial in the *Saturday Evening Post* for June 14 is on the electric railway financial situation. The title is "Settle This."

# Some Mysterious Car Ailments

## Little but Important Troubles That Tend to Keep Equipment Men Interested in Their Work

CONTRIBUTIONS ARE INVITED FROM THE FIELD

### Another Suggestion for Securing Proper Connection for Fields of Interpole Motors

A SHORT ARTICLE in this department published in the April 19 issue of the ELECTRIC RAILWAY JOURNAL described trouble due to a wrong connection of the interpole fields of a motor. In the case described the interpole field was reversed and flat spots on the commutator developed very rapidly.

On a large Eastern property similar trouble was experienced not only from the interpole fields being reversed but also from the main field coils of tapped-field motors becoming reversed. These field coils were so constructed that they could be put in the motor either side up with equal facility. Where new fields were installed at the shops several cases occurred where these were installed wrongly and it became necessary to devise some means so that the shopman could tell readily when the fields were properly installed. A method which has proved entirely satisfactory was to stamp the terminals with numerals instead of with the letters "O" and "I" which were previously employed. These numerals were selected so as to tell not only which end of the coil was the commutator end but also which was the top and bottom side of the coil.

### A Train That Wrecked Itself

IN ORDER to begin passenger operation on a certain high-speed electric line it was necessary to resort to some temporary construction at one of its terminals. The electric interlocking and signal plant could not be completed in time, and a temporary hand-throw switch was installed to regulate the movement of trains when entering and leaving the one-pocket terminal.

An employee, whose duty it was to govern all train operations into and out of this pocket, was stationed at this hand-throw switch on the tracks. During the course of his work he found it rather difficult to throw this switch without a better leverage. He accordingly slipped a short length of 2-in. pipe over the switch handle each time that he operated the switch. This method worked satisfactorily until one time the handle stuck so that he could not remove the pipe. The switch was thrown and the motorman had received the signal to proceed out of the pocket. The forward truck of the first car passed over the switch point in the proper direction, but on account of the curvature of the tracks and the length of the car there was sufficient overhang at the center of the first car so that the low body construction at the center doors struck the 2-in. pipe handle. This forced the switch to the opposite position just before the rear truck of the first car reached the switch point. The front truck thus started to operate on one track while the rear truck was on another track. There were several upright columns at this point with which the car collided. The force of impact was so great that it literally cut the car in half. Considering the present high cost of this type of car, which is about $25,000, the accident was a very costly one.

### A Puzzling Case of Battery Control Trouble

A LARGE Eastern railway property operating cars equipped with multiple-unit, battery-type control, used single-car operation during the off-peak period and train operation during rush hours. At one of the inspection and overhauling shops trains were made up by adding a car taken from the yard to the one already in service. On one occasion the coupling was made, but as soon as the low-voltage control jumper was inserted the control equipment of both cars would not operate. An electrician was hastily summoned, and he found all battery fuses blown. He applied new fuses to one of the cars, but on attempting to install new fuses in the other car all fuses were immediately blown again. Thinking that there might be a short-circuit in the latter car, he removed the control jumper from between the cars and inserted new fuses so that the control equipment of both cars operated satisfactorily. This seemed to indicate that there was a short-circuit in the jumper itself. A new jumper was obtained and inserted, whereupon all the battery fuses were again blown. The passengers were then transferred to another train and the two cars were brought into the shop for a careful inspection and test. The control equipment on each car was tried out separately and both operated properly, but as soon as the cars were connected with a jumper the battery fuses would be blown. Connections were rung out and the usual tests for wrong connections were applied, but everything appeared satisfactory. The batteries were removed from both cars, and one of them was found to have been reversed; that is, the positive end had been placed where the negative end should have been and *vice versa*. With a single car this did not affect its operation as there was the necessary difference of potential between the positive and negative battery wires, but as soon as this car was coupled electrically to another car with batteries properly installed there was a short-circuit through the fuses and both batteries of the two cars. This, of course, resulted in the blowing of the fuses, through the connection of the negative of one battery to the positive of the other.

As a precaution to prevent a recurrence of this trouble the battery boxes were arranged with small wooden cleats so that it would be impossible to insert them improperly.

## Paint and Varnish Prove Effective Insulators

A TRAIN operating in elevated service on a large Eastern railway system was ready to leave the yard but the motorman found that the train would not start. He examined all fuses to make certain that none had blown, and other parts of the equipment that might be the cause of the trouble, but nothing unusual was found. He then signaled for an electrician to help him out of the difficulty. The motorman operated hismaster controller at the front end of the train in the usual manner while the electrician noted the operation of the various switches of the multiple-unit equipment. It was found that the control operated properly but that the line switch did not come in. This being the first switch in circuit, there was no power to operate the train.

With this type of equipment, cut-out and reset switches were located in the motorman's cab. The cut-out switch was for the purpose of opening the line switch control circuits so that the control apparatus could be operated without the line switch coming in. The reset switch was to reset the line switch or circiut breaker in case it blew from overload. In this particular case the cause of the trouble was found to be a small amount of varnish on the switch blade of the cut-out switch. This car had been in the shop for its annual painting and varnishing, and in varnishing the woodwork of the interior of the cab a small amount of varnish had been placed on the switch blade. The trouble was quickly remedied by scraping this off and the train proceeded into service. Special instructions were given the painters to be careful not paint the contact surfaces of any switches or electrical equipment.

## Too Much Lubrication Is as Bad as None at All

THE train dispatcher had just been remarking how smoothly everything was running when the telephone rang and an excited voice asked to have an electrician sent at once to the incline on the main line. The electrician hurried to the scene of the trouble where he found a two-car train stalled which was equipped for double-end multiple-unit control operation. Other cars were now being held up by the disabled train so that it was necessary to have quick action. By attempting to operate the equipment from the different master controllers of the train the electrician found that both cars would work correctly if operated from the No. 2 controller of the dead car. With the motorman in the front cab to apply the air brakes and give the signals for operation the electrician operated the train to the terminal from the cab at the middle of the two cars. The train was then ordered to the shop where a careful inspection was made. It was found that when the control was operated in the usual manner from the front cab that the control notched up correctly on the good car but would not notch up on the other. As both cars operated correctly from the No. 2 controller of the dead car, it was evident that trouble existed somewhere on the reverse control wire of the dead car. This trouble was finally located as a ground on the interlock finger of the main reverser. Current had passed to ground for a distance of 2 in. along the surface of the drum from this control finger to the grounded main circuit reverse finger. It was found that oil and vaseline which had been applied for lubricating the contacts had run down over the insulating surface and had gathered small particles of copper and brakeshoe dust which had ultimately caused the ground. This trouble was easily eliminated by thoroughly wiping the insulating surface of the drum. To prevent the recurrence of this trouble instructions were given to the repairmen to exercise more care in lubricating contact surfaces and to use less oil and vaseline.

## The Chicken-Egg Problem Has Its Parallel in Railway Transportation

TWO railway men were discussing the subject of delays and overcrowding recently. The first maintained that whenever a car becomes overcrowded this condition results from being delayed. The second argued that it is the overcrowding that causes the delay and that the cars are delayed more and more because they are jammed full on the back platform so that passengers cannot readily get aboard.

This is the chicken-egg problem all over again. Eggs come from chickens, chickens come from eggs. Delays mean overcrowding, overcrowding means delays. Where did it start?

It may have been due to a person not standing at the right place when the car stopped, or to the passenger who made the car stop a second time to let him or her board or alight. It may be due to the passenger who hadn't the right fare or ticket ready and caused a delay on the platform, or maybe the passenger did not unfold his transfer before handing it to the conductor. Most likely it began with the first man who insisted on staying on the rear platform of the car. When one man remains there, others do the same. Two passengers who stand near the rear of a car beget more rear-end stickers, and so the game goes on. Passengers apparently do not understand that by moving forward in the car as far as possible, even when the car is not crowded, that the service will be greatly improved.

Peter Witt, in an address before the New England Street Railway Club recently, made these interesting comments upon why people stand in cars:

"I used to think the people wanted to sit, but when I saw a motor of inferior kind drawing a trailer of a superior kind, with the people standing in the motor and vacant seats in the trailer, I became convinced that people do not want seats. They want to get home, and they want to go by the first car that comes along, on the theory that it will get them home sooner. Of course they don't know, as you know, that the more they crowd the first car, the later they will get home."

This latter seems to give the overcrowding-means-delay argument the best of it.

F. N. Koziell, chief engineer Railway Storage Battery Company, calls attention to the statement of the weight of the Yucatan cars described on page 968 of the issue of this paper for May 17. The weight complete is 28.3 tons, not 37.5 tons as stated.

# Insuring Standard End Play for Armatures

### The B. R. T. Provides Calipers for Each Overhauling Shop to Insure Rapid and Uniform Installation of All Armatures

WHEN installing a new armature and new armature bearings in a motor shell one of the problems which the overhauler has to solve is the proper location of the bearing faces. Sufficient clearance should be allowed between the armature and bearing faces to insure free movement of the armature, for if this is too tight hot bearings will result. On the other hand care must be taken to see that the end play is not too great, otherwise the armature head may be ripped off by striking the brush-holders or the back ends of the armature coils may be damaged by striking the frame.

The mechanical department of the Brooklyn Rapid Transit Company has designed a special form of shop caliper to facilitate this installation and to make sure that all armatures are installed with a standard end clearance of $\frac{1}{16}$ in. The accompanying illustrations show the details and the method of use. The standard practice of this company is to require that all new armature bearings be fitted to the individual shafts on which they are to be placed and that their faces be finished to standard dimensions. The babbitting and rough finishing of all armature bearings is done at a single shop. Bearings are rough-bored to a diameter such that it will still be necessary to turn off $\frac{1}{16}$ in. of babbitt in order to fit the smallest size shaft allowed for the particular type of motor. Shafts are calipered at the overhauling shops and in the electrical repair department for uneven wear on bearing seat. Where necessary the shafts are trued up in a lathe. Shafts of armatures for surface cars which are worn $\frac{1}{8}$ in. and of elevated cars which are worn $\frac{1}{16}$ in. below standard are scrapped. In order to provide for uniform clearance bearings are calipered with a combination inside and outside caliper. The outside end is set to fit over the shaft on which a special clearance gage strip 0.012 in. thick has been placed. The bore of the bearings is then made to fit the inside end of the caliper.

The method used in fitting armature bearings into motor frames by means of the special shop calipers, illustrated herewith, consists first of setting the caliper to give the distance between the outside faces of the armature collars. This gives a reading *A* on one scale of the caliper. The caliper is next set to give the measurement between the inside faces of the motor shell housings *B*. By referring to tables for the different types of motors' samples of which are given herewith, the distance that the bearings project inside the frame and indicated by *C* and *D* is read directly. The bearings to be used are then placed in position and the amount that it is necessary to turn off the faces to give the desired dimensions is obtained.

To illustrate this let us consider the installation of a new armature and bearings in a Westinghouse-101 mo-

WESTINGHOUSE No. 101 MOTOR

| Reading at *B* | Reading at *A* $\frac{9}{16}$ C | $\frac{9}{16}$ D | $\frac{19}{32}$ C | $\frac{19}{32}$ D | $\frac{5}{8}$ C | $\frac{5}{8}$ D | $\frac{21}{32}$ C | $\frac{21}{32}$ D | $\frac{11}{16}$ C | $\frac{11}{16}$ D |
|---|---|---|---|---|---|---|---|---|---|---|
| $\frac{15}{16}$ | $1\frac{9}{16}$ | $1\frac{3}{4}$ | $1\frac{35}{64}$ | $1\frac{47}{64}$ | $1\frac{17}{32}$ | $1\frac{23}{32}$ | $1\frac{33}{64}$ | $1\frac{45}{64}$ | $1\frac{1}{2}$ | $1\frac{11}{16}$ |
| $\frac{31}{32}$ | $1\frac{37}{64}$ | $1\frac{49}{64}$ | $1\frac{9}{16}$ | $1\frac{3}{4}$ | $1\frac{35}{64}$ | $1\frac{47}{64}$ | $1\frac{17}{32}$ | $1\frac{23}{32}$ | $1\frac{33}{64}$ | $1\frac{45}{64}$ |
| 1 | $1\frac{19}{32}$ | $1\frac{25}{32}$ | $1\frac{37}{64}$ | $1\frac{49}{64}$ | $1\frac{9}{16}$ | $1\frac{3}{4}$ | $1\frac{35}{64}$ | $1\frac{47}{64}$ | $1\frac{17}{32}$ | $1\frac{23}{32}$ |
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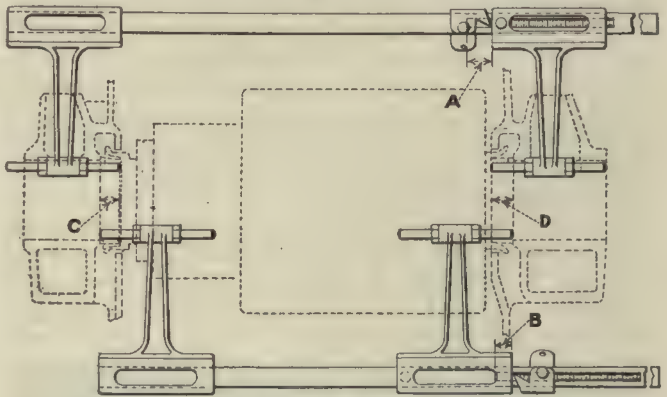
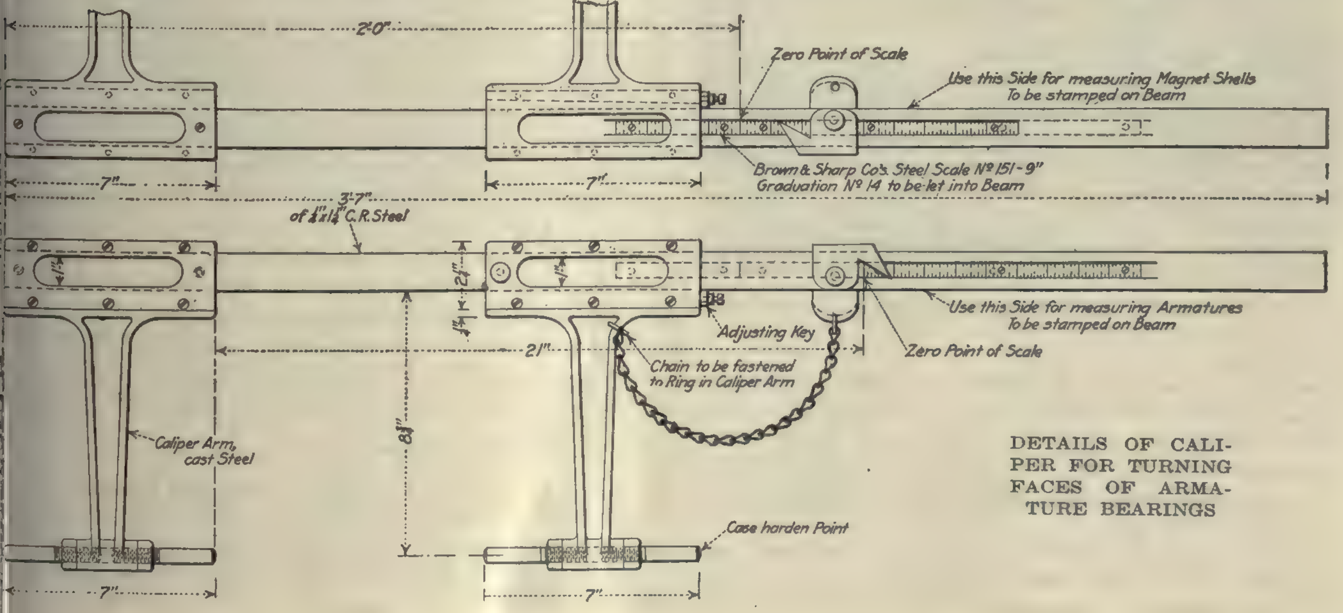
| $1\frac{1}{16}$ | $1\frac{5}{8}$ | $1\frac{13}{16}$ | $1\frac{39}{64}$ | $1\frac{51}{64}$ | $1\frac{19}{32}$ | $1\frac{25}{32}$ | $1\frac{37}{64}$ | $1\frac{49}{64}$ | $1\frac{9}{16}$ | $1\frac{3}{4}$ |

GENERAL ELECTRIC No. 234-A MOTOR

| Reading at *B* | Reading At *A* $5\frac{1}{16}$ C | $5\frac{1}{16}$ D | $5\frac{3}{32}$ C | $5\frac{3}{32}$ D | $5\frac{1}{8}$ C | $5\frac{1}{8}$ D | $5\frac{5}{32}$ C | $5\frac{5}{32}$ D | $5\frac{3}{16}$ C | $5\frac{3}{16}$ D |
|---|---|---|---|---|---|---|---|---|---|---|
| $3\frac{5}{8}$ | $\frac{3}{4}$ | $\frac{3}{4}$ | $\frac{47}{64}$ | $\frac{47}{64}$ | $\frac{23}{32}$ | $\frac{23}{32}$ | $\frac{45}{64}$ | $\frac{45}{64}$ | $\frac{11}{16}$ | $\frac{11}{16}$ |
| $3\frac{21}{32}$ | $\frac{49}{64}$ | $\frac{49}{64}$ | $\frac{3}{4}$ | $\frac{3}{4}$ | $\frac{47}{64}$ | $\frac{47}{64}$ | $\frac{23}{32}$ | $\frac{23}{32}$ | $\frac{45}{64}$ | $\frac{45}{64}$ |
| $3\frac{11}{16}$ | $\frac{25}{32}$ | $\frac{25}{32}$ | $\frac{49}{64}$ | $\frac{49}{64}$ | $\frac{3}{4}$ | $\frac{3}{4}$ | $\frac{47}{64}$ | $\frac{47}{64}$ | $\frac{23}{32}$ | $\frac{23}{32}$ |
| $3\frac{23}{32}$ | $\frac{51}{64}$ | $\frac{51}{64}$ | $\frac{25}{32}$ | $\frac{25}{32}$ | $\frac{49}{64}$ | $\frac{49}{64}$ | $\frac{3}{4}$ | $\frac{3}{4}$ | $\frac{47}{64}$ | $\frac{47}{64}$ |
| $3\frac{3}{4}$ | $\frac{13}{16}$ | $\frac{13}{16}$ | $\frac{51}{64}$ | $\frac{51}{64}$ | $\frac{25}{32}$ | $\frac{25}{32}$ | $\frac{49}{64}$ | $\frac{49}{64}$ | $\frac{3}{4}$ | $\frac{3}{4}$ |



METHOD OF USING CALIPER GAGES



2'0"
Zero Point of Scale
Use this Side for measuring Magnet Shells
To be stamped on Beam
Brown & Sharp Co's Steel Scale Nº 151-9"
Graduation Nº 14 to be let into Beam
7"
7"
3'7"
of 1"x1¼" C.R.Steel
2¼"
1¼"
Adjusting Key
Use this Side for measuring Armatures
To be stamped on Beam
Zero Point of Scale
21"
Chain to be fastened to Ring in Caliper Arm
Caliper Arm, cast Steel
8¾"
Case harden Point
7"
7"

DETAILS OF CALIPER FOR TURNING FACES OF ARMATURE BEARINGS tor. If the reading *A* is ⅝ in. and *B* 1 in. we find by referring to the table for this motor that the distance *C* by which the bearing should project inside at the commutator end is 1 9/16 in. and the distance *D* by which the bearing should project inside the motor at the pinion end is 1¾ in. Bearings fitted to these dimensions will provide 1/16 in. end play for the armature.

The use of these calipers and tables provides a very accurate and rapid method for fitting the bearings and makes certain that all are installed uniformly and with the correct clearance.

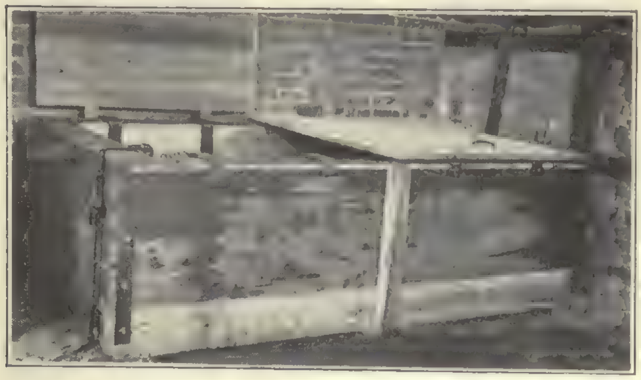
## Keeping Quenching Oil Cool for Tempering Steel Springs

### Union Traction Company of Indiana Builds Water and Air-Cooled Tank at Its Anderson Shops for Use in Tempering Springs

AT THE Anderson shops of the Union Traction Company of Indiana, trouble was experienced in tempering car springs because the oil in which the hot springs were immersed direct from the furnace could not be kept cool. A new cooling tank has recently been constructed and the results indicate that there will be no further trouble in this respect.

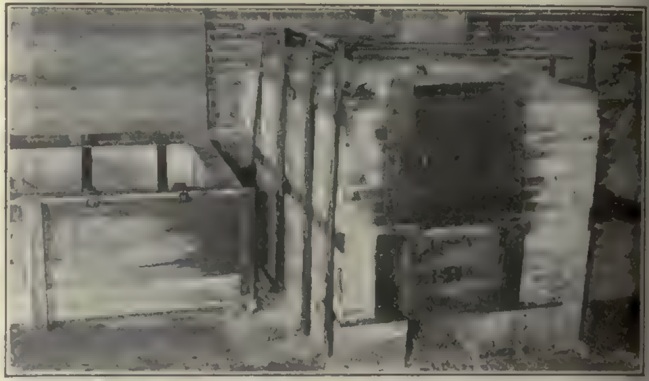
The tank frame is constructed from 1¼-in. timber and measures approximately 7 ft. long, 4 ft. wide and 27 in. high, with the ends of the side timbers protruding and tied with rods as shown in an accompanying illustration. The inside of the tank is lined with No. 24 galvanized iron, leaving a wall space of 4 in. on all four sides. A second lining of galvanized iron is put in at the bottom and all joints soldered. Cold water is piped into this wall space entering through a 1½-in. pipe near the top at one end and leaving at the opposite end through three 1-in. pipes leading into a 1½-in. outlet.

Several pipes are laid across the bottom of the oil tank. These are perforated in the side with small holes and are connected to an air line piped over one side of the top of the tank. Four straps of 2½-in. x ½-in. iron bent into U-shape act as braces to the sides of the tank. These extend to within an inch or two of the bottom and on them is laid a strip of wire mesh which gives a new bottom to the tank on which the springs are laid. The tank is fitted with covers and is filled with a quantity of oil.



NEW QUENCHING OIL TANK FOR TEMPERING STEEL SPRINGS

Car springs lose their temper with age and hard service. When they have lost much of their spring and have flattened considerably they are taken into the shop and again bent into the proper shape. They are then placed in the furnace shown in an accompanying illustration. The heat from the firebox below passes up through a hollow wall on one side and enters the oven through 4-in. x 5-in. ports about every 4 in. along one side, passes over the springs and is drawn through similar openings in the opposite side out into the chimney.



FURNACE FOR HEATING SPRINGS AND QUENCHING OIL TANK

After the proper temperature has been reached the springs are drawn from the furnace and quenched in the tank of oil. A flow of cold water circulating around the four sides and bottom of the tank and streams of air from the pipes in the bottom of the oil keep the oil cool and aërated, so that the springs are properly quenched without unduly heating the oil.

It is planned soon to install an air-operated bulldozer in this room with proper dies for bending the springs into the desired shape before tempering. This work is now done by hand.

## Hollow Boring of Axles to Reduce Weight

THE Twin City Rapid Transit Company, Minneapolis, Minn., has for the past seven years been hollow-boring all of its 4¼ x 8-in. car axles in order to reduce the total weight of the car. A special lathe machine was designed and built by the American Machine Company for this purpose. A hole 2 in. in diameter is bored through the center of the axle, reducing the weight of the axle approximately 60 lb. at a cost of 60 cents per axle. This figure is based on the cost of labor approximately three years ago, as no axles have been bored recently.

Since 1912 approximately 2500 axles have been hollow-bored with no detrimental effects. It is believed that the metal in the center of the axle contributes very little to the strength and this would seem to be borne out by the fact that of the 2500 axles on this property no breakages or other accidents have occurred. These axles are not heat-treated, but are bought in the rough by the company, and are forged and finished in the company's shops. It is claimed that hollow boring of heat-treated axles actually increases the strength of the axles.

*Electric Railway & Tramway Journal*, London, notes that women conductors are disappearing from tramways in almost all parts of Great Britain, in many cases rapidly, making way for the men who have been fighting for their country.

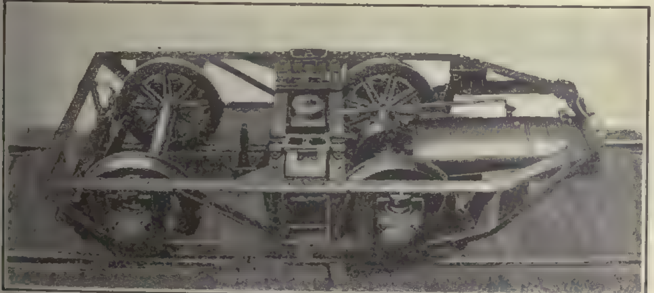
# Life of Creosoted Piles

### Still Sound After Twenty-eight Years' Service in Southern Pacific Wharf

INTERESTING facts as to the effect of salt water on wooden piles were developed this year when a wharf of the Southern Pacific Railroad on San Francisco Bay was removed to make room for port improvements. The wharf was the oldest creosoted pile structure which thus far had been dismantled on the Pacific coast and contained about 14,000 creosoted piles which had been in service for periods ranging from eighteen to twenty-nine years. Of these piles, interest centers particularly in 600 which were of Douglas fir, well seasoned before being treated with creosote by the Bethel process in the fall of 1889, and were driven in 1890. Records show that under a pressure of 200 lb. per square inch and a temperature of 260 deg. Fahr., the piles absorbed 14.17 lb. of creosote per cubic foot.

Of these 600 piles, thirty-three were selected at random for test purposes when the wharf was dismantled. Out of this number twenty-two (67 per cent.) were entirely sound; two (9 per cent) had been slightly attacked by borers; six (18 per cent) had been severely attacked and two (six per cent) were so damaged as to be unfit for further use. These percentages were typical of the entire lot, it is reported, and about 70 per cent of the 600 are to be redriven just as they are. In fact, this percentage of poles suitable for redriving, it is reported, applies approximately to the entire 14,000 piles. Those not as suitable showed damage only between mud line and high-water mark, and other portions of these piles were in good condition.

The results of this study are believed to confirm the theory that a creosoted pile is absolutely immune from attack of marine borers such as exist in Pacific Coast waters, so long as the shell or portion of the pile impregnated with creosote remains intact. If the borer can gain access to the inner and untreated core through some defect in the wood, he will work upward and downward in the untreated wood, but in no case have traces of borers been found in the creosoted section.



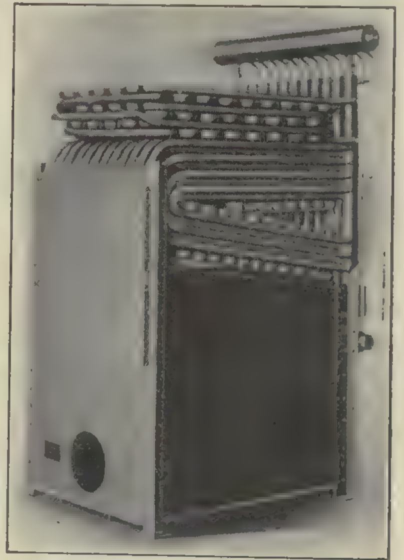
FRONT TRUCK AND METHOD OF INSTALLING ENGINE OF UNIT RAILWAY CAR

NEW TYPE OF STEAM-DRIVEN RAILWAY CAR USING GASOLINE OR KEROSENE AS FUEL

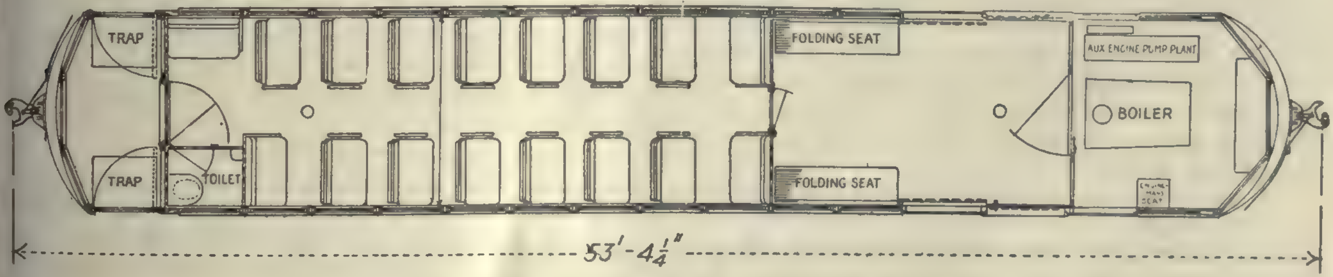
## Steam-Driven Passenger and Baggage Car for Railway Operation

THE Unit Railway Car Company, Boston, Mass., is placing on the market a steam-driven car to which the name "Unit Railway Car" has been applied. It is propelled by a twin cylinder engine developed by F. O. Stanley, inventor of the Stanley steam automobile. The engine is mounted on and forms a part of the forward truck as shown in an accompanying illustration. Power is transmitted direct to the axle by a spur gear, the engine and driving gear running in an oil bath in an oil-tight case.

Either kerosene or refined crude oil may be used for fuel. The fuel is fed to the combustion chamber under constant pressure controlled by an automatic valve. The water is also fed automatically to the boiler, which is located in the forward part of the car. Control of the steam as it passes from the boiler to the engine gives direct control of the car, and this is effected by a throttle valve placed in the steam line where it leaves the boiler. The throttle valve is operated by control levers in a similar manner to that used in the control of the modern locomotive. The trucks used are of the archbar type and are equipped with Timkin roller bearings. The engine and front truck



BOILER AND SUPERHEATER FOR STEAM-DRIVEN RAILWAY CAR



SIMPLIFIED PLAN OF LAYOUT OF STEAM-DRIVEN RAILWAY CAR constitute a unit, the bolter being placed quite near the driving axle in order to secure proper weight on the driving wheels.

The manufacturer shows one of these new types of car at the Atlantic City convention of the American Railroad Association, in session as this issue of the ELECTRIC RAILWAY JOURNAL goes to press.

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# Air Hoist Built from Old Brake Cylinders

### Union Traction Company of Indiana Designs a Hoist from Scrap Material for Use in the Brass Foundry

TO FACILITATE the handling of 60-lb. and 80-lb. crucibles to and from the furnaces in the brass foundry of the Union Traction Company, Anderson, Ind., an air hoist has been erected. This has been built almost entirely from scrap material, so that the cost of the hoist has been confined practically to the labor of construction and erection.

The hoist itself is made from four old 7-in. straight air-brake cylinders discarded from antiquated equipment. The cylinders are separated from each other by a pasteboard gasket and are held together by six ½-in. rods, extending the full length of the four cylinders and passing through holes drilled in the flanges. As an additional factor of safety, the cylinders are spot welded together with the oxy-acetylene torch. The plunger is a 1½-in. steel rod with a large hook on the lower end and is operated in the same manner as the brake-cylinder plunger. The hoist is suspended by a ring from a four-wheel truck which operates on a horizontal track 10 ft. long. This track is composed of two angle irons, set back to back and separated by lugs. The track is fastened 9 ft. from the floor by a large angle to the bottom of a 6-in. I-beam which serves as a vertical support extending from the floor to the ceiling and so pivoted at each end as to revolve freely. The free end of the track is suspended by a rod from the top of the vertical support.

AIR HOIST BUILT FROM OLD SCRAP 7-IN. BRAKE CYLINDERS

Air at the shop pressure of 90 lb. is piped to the vicinity of the hoist and this line is connected by a rubber hose to a pipe on the vertical support. An ordinary three-way air valve is inserted in the line about 4 ft. from the floor, and the piping then extends up the support again and is connected with the hoist by means of a long rubber hose to permit the use of the hoist within a radius of 10 ft. in any direction from the vertical support.

The chief use of the hoist, as already mentioned, is to lift into and out of the furnaces, by means of a special grip device, the crucibles of brass which weigh approximately 160 lb. The hoist is capable, however, of easily handling 2000 pounds.

# Economically Constructed Locomotive for Handling Coal

### Much of the Material Which Was Used in the Construction of a 60,000-Lb. Locomotive Was Salvaged

THE Union Traction Company of Indiana has recently completed a locomotive for use exclusively in handling coal at the power house. The over-all dimensions are: length 30 ft., width 8 ft., height from top of rail to clearance line 12 ft. 6 in. A great deal of the material used in the construction of the body was salvaged.

The end sills, side sills and cross sills consist of one 15 in., 40-lb. channel each, the end sills and side sills having flanges set in. There are four longitudinal sills each being a 4-in. x 10-in. stringer, and the draft beams are 10-in. I-beams. The cross sills are spaced 6 ft. apart and the wheelbase is 18 ft. The flooring of the car is 1¾ in. yellow pine. The 15-in. channels used for sills were salvaged from an old bridge on the company's right-of-way, and the draft beams were salvaged from one of the shops.

The cab of the locomotive is of wood construction, 4 ft. x 6 ft., the material being salvaged and rebuilt from an old work car. The K-14 control equipment used also came from the same car. The trucks were made by the St. Louis Car Company. The locomotive is equipped with four GE-57 motors, M-15-C automatic air brakes, Tower couplers and electric markers. A 23-watt headlight is operated in a five-light series with two markers and two lights within the cab. The total weight of the locomotive is approximately 60,000 lb.

LOCOMOTIVE BUILT BY UNION TRACTION TO HANDLE COAL FOR POWER PLANT

It has been found under operating conditions that the locomotive is a trifle light for handling several cars of coal on a grade. Weight will be temporarily added by placing materials on the platform, and eventually the 15 in. of floor space between sills will probably be filled with concrete. Other locomotives in use by the company have the sloping end hoods, but this equipment was built without the hoods so that, if necessity required, it could be used as a general utility car in transporting materials or men as well as to pull a train.

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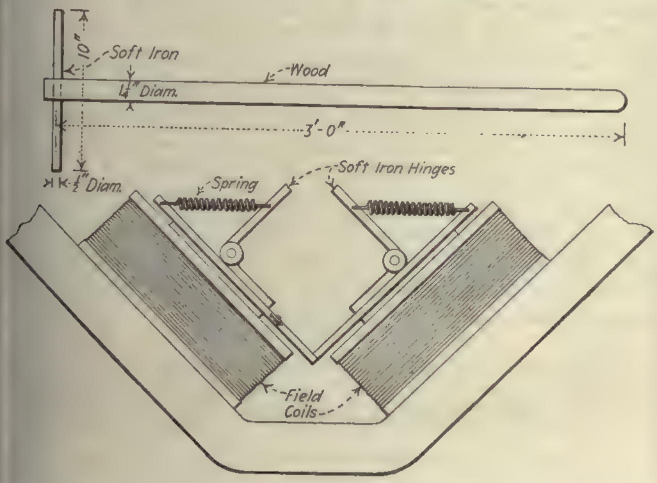
In the article on third-rail bonding appearing in last week's issue of this paper one of the cuts shown in the center of page 1155 was inverted and the captions for the twin terminal bond and soldered type of ribbon bond were interchanged.

# Testing Newly Installed Field Coils for Polarity

### Simply Constructed Shop Devices Insure Proper Installation and Connection of Railway Motor Field Coils

WITH some types of motors it is a very easy matter to reverse the field coils or to install improper coils. With such motors the only safe plan after new fields have been installed is to test their polarity. Testing with a compass is not a satisfactory method, as the magnetism from the motor field is liable to reverse the polarity of the compass needle so that a false indication will be given.

One method for testing the polarity of newly installed field coils which has been in use at the East New York surface shop of the Broklyn Rapid Transit System for several years has proved entirely satisfactory. The testing apparatus used consists of two pieces of round soft iron, about ½ in. in diameter and 10 in. long, which are inserted transversely in the end of two wooden rods about 3 ft. long, and 1½ in. in diameter. The iron rods make a driving fit in the poles which serve as handles. By means of a water rheostat a current of from 7 to 10 amp. is passed through the field windings. Two of the testing devices are used while making the test, one end of each iron rod being placed in the center of each field magnet. Befor the circuit is closed through the field winding the outside ends of these testing rods are held apart about 2 in. When the current is passed through the windings they will be drawn together where the two pole faces have opposite polarity and repelled if the faces have the same polarity. The wooden handles on these testing devices are used as a safety precaution. In an earlier form of the apparatus, the workman held the iron pieces directly and experience showed that there was danger of the two pieces being drawn too forcibly together if an excessive current was passed through the motor field. Under this condition if the workman had the iron pieces in his hands he would be liable to injury and a short-circuit at the field terminals might result, while with the wooden handles he has a longer leverage and can hold the pieces steadier.



SHOP TESTING APPARATUS FOR DETERMINING POLARITY OF RAILWAY MOTOR FIELDS. AT TOP, IRON ROD WITH HANDLE. AT BOTTOM HINGED PIECES HELD IN POSITION BY SPRINGS

Another device similar to the preceding in its method of operation is shown in another illustration. This consists of a wooden framework upon which two-hinged iron pieces are mounted. The wooden framework is so constructed that the hinge pieces will come in the center of the pole faces of a motor. In their normal position the hinged ends are held about 2 in. apart by two springs. In place of a water rheostat for cutting down the current to the desired value for energizing the field coils, a resistor has been constructed of approximately 60 ohms resistance. The end of this has a flexible lead which is attached to a hook pole. A 20-amp. fuse is mounted on the pole in series with the connection as a matter of precaution. The hook of the pole is placed over a trolley wire and the regular railway shop voltage will cause from 8 to 10 amp. to pass through this resistor and through the field windings. The advantage of this last method over the preceding is that one man can make the test on a pair of field coils by placing the testing apparatus in position first and then closing the circuit, while with the preceding method it is necessary to have two men, one to hold the testing pieces in position and the other to close the circuit.

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## AMERICAN ASSOCIATION NEWS

### Mail Hearing in Boston

A HEARING was given to the New England electric railways at Boston, Mass., on June 13 and 14 by Attorney-Examiner George N. Brown of the Interstate Commerce Commission upon rates to be paid by the United States government for the transportation of mail on trolley lines in that district. Joseph Stewart, assistant to the Attorney General, appeared as at earlier hearings as counsel for the Post Office Department and S. S. Ashbaugh appeared for the electric railways, representing the American Electric Railway Association. The New England case was prepared with great thoroughness under the leadership of a committee of the New England Street Railway Club headed by R. B. Stearns, chairman, the other members being C. K. Reed, Howard Fritch and D. P. Abercrombie, Jr.

As was the case in the Washington hearing of June 9, the evidence showed that the companies are receiving but 25 to 33 per cent of what should be paid for the services rendered. It was brought out that twenty-seven leading companies receive a total of but $49,359 annually for their mail service. The schedule of witnesses included members of the above committee and the following: Clark V. Wood, president Springfield (Mass.) Street Railway; Roscoe Anderson, Rhode Island Company; Elton S. Wilde, Union Street Railway, New Bedford, Mass.; R. E. Hood, Massachusetts Northeastern Street Railway; M. G. Stratton, Shore Line Electric Railway, Norwich, Conn., and V. S. Curtiss, Connecticut Company, New Haven.

The exhibits filed in the case included a map of all the electric roads in New England, lists of companies, mileage of companies, statistical summary of replies to the committee's questionnaire, detailed data as to mail service, costs and revenue on each system replying, maps of individual roads showing mail routes. Witnesses were examined as to their special burdens in handling through, side and terminal service since 1916, when the present law went into effect governing electric railway mail pay, and witnesses for companies under public control emphasized the intent of the legislation under which they operate to provide for meeting all costs of all classes of service in the revenue received from operation. It was provided in the procedure that each company might have its own ideas as to the proper method of rate-making, but all were agreed that the present compensation is absurdly inadequate. It was pointed out that unless the rates are very materially increased, a general withdrawal from the carriage of mails by electric roads in New England must follow.

An example of the burdensome nature of mail transportation under present conditions was presented by R. B. Stearns, first vice-president, Eastern Massachusetts Street Railway, Boston. On this system, which includes 915 miles of track, there are twenty-eight mail routes. In 1918, 42,247 trips were made between terminals, the average weight of pouches being 18 lb. The pouches ranged in weight from 8 to 100 lb., the heavier cases arising from the transportation of shoe heels by parcel post.

The length of the routes varies from 0.75 to 19.2 miles, the weighted average length of route being 4.37 miles. The annual pouch ton-miles is 8383, and the company receives but $5,874 for its mail-handling service. The carriage of parcel post sacks is the chief cause of congestion. The interference with traffic and annoyance to passengers are so serious that the company would have discontinued the carriage of mails last spring had it not been for the hearings now being realized. The side service is especially troublesome and should be eliminated entirely, and should be handled by specially delegated government employees. The compensation for parcel post packages should be on the basis of space and weight required, and no company, Mr. Stearns said, should be obliged to carry milk, chickens and produce on its passenger cars. Much relief would be obtained if the Post Office would limit passenger car mail to first-class matter in three or four pouches, arranging for the carriage of other mail on the freight cars of the company. The relation of the mail revenue to the total passenger earnings, which are about $13,000,000 per year, is too small to justify the present service. The company is furnishing a $40,000 service for less than $6,000.

Many instances of apparent discrimination, inequalities in compensation, and inadequacy of revenue resulting from present arrangements were brought out by the witnesses. It was shown that in numerous cases where railways have given up the carriage of mails, the contractors succeeding have been paid by the government three to four times as much as the companies were able to obtain.

## Zone Systems of Fare Collection Discussed

A MEETING of the American Association committee on zone systems was held in New York City on June 13. Of the committee, W. H. Sawyer, Columbus, Ohio, Chairman; Thomas Conway, Jr., Philadelphia, Pa.; J. H. Hanna, Washington, D. C.; L. H. Palmer, Baltimore, Md.; R. P. Stevens, Youngstown, Ohio; L. S. Storrs, New Haven, Conn., and C. L. S. Tingley, Philadelphia, Pa., were present. E. B. Burritt, secretary of the association, and Walter Jackson, of the ELECTRIC RAILWAY JOURNAL were also in attendance.

The committee confined itself largely to a general discussion of the scope of the work, and Dr. Conway suggested as an outline for the committee's report that it contain sections on bibliography, terminology, field of application for zone systems, varieties of zone systems, methods of fixing rates and methods of collecting fares. Doctor Conway and Prof. A. S. Richey were appointed to draft a report along the lines suggested. R. M. Feustel, president Fort Wayne & Northern Indiana Traction Company, and Mr. Jackson will be asked to assist the sub-committee. July 7 was selected as a tentative date for the meeting of the sub-committee and July 11 as that for the next meeting of the full committee.

The committee on collection and registration of fares, of the Transportation & Traffic Association, was requested through the secretary to confer with the committee on zone systems before submitting that portion of its report dealing with the collection and registration of fares on zone systems.

## Providence Section Activities

THE Rhode Island Company section held meetings on April 7 and May 6 with attendances of more than 100 at each. At the April meeting A. L. Campbell was elected president, W. C. Slade and A. E. Paddock vice-presidents, H. B. Shaftoe and S. J. Allard secretaries, E. E. Worrall treasurer, and C. E. Redfern, J. A. Lockhart, W. D. Wright and A. V. Gardiner directors. At this meeting W. D. Wright, superintendent of equipment, described in non-technical language the development of the equipment features of an electric railway car. Theodore F. Green, co-receiver of the company, explained what is being done to straighten out the company's financial affairs. At the May meeting Corp. H. E. Eklund related his war experiences. At both of these meetings the entertainment features were made much of by the members in attendance.

# LETTER TO THE EDITORS

## Rule Should Be In Code

NATIONAL FIRE PROTECTION ASSOCIATION
ELECTRICAL COMMITTEE

BOSTON, MASS., June 13, 1919.

To the Editors:

In the 1915 edition of the National Electrical Code the second paragraph of Rule 23, section "a" read as follows:

> Where the switch required by No. 24 "a" is inside the building, the cutout required by this section must be placed so as to protect it, unless the switch is of the knife-blade type and is enclosed in an approved box or cabinet, under which conditions the switch may be placed between the source of the supply and the cutout.

Through an error this section was omitted when the 1918 edition was printed.

The electrical committee of the National Fire Protection Association has voted that this matter be given the widest publicity, that all interested parties may be advised that this section was omitted. The electrical committee would recommend that inspection departments approve an installation in accordance with this paragraph.

RALPH SWEETLAND,
Secretary Electrical Committee.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Detroit Men Accept

### Compromise on Wage of Sixty-five Cents Maximum—Fare Increase Part of Settlement

The employees of the Detroit (Mich.) United Railway resumed work Thursday night, June 12, after voting to accept the compromise wage offer of the company. The increase of wages, which is retroactive to May 16, provides for a scale of 50 cents an hour for the first three months, 55 cents for the next nine months and 65 cents an hour after one year's employment. This increase, according to W. D. Mahon, president of the Amalgamated Association, makes the Detroit men the highest paid employees of their kind in the United States and Canada.

### COMPANY PRESENTS SETTLEMENT PLAN

Immediately following the issuance of the court order by Circuit Judge Marschner by which the controversy as to proper fare rate was placed in the hands of an arbitration board, officials of the railway presented a plan to the men whereby they would all be granted a straight increase of 10 cents an hour. This proposal was flatly rejected and finally a program calling for increases of 7, 9 and 12 cents an hour was decided upon. This plan involves about the same amount of money as the first.

As a result of the strike settlement 3-cent tickets on the Pingree lines, the Cross Town, Sherman, Harper and Fourteenth lines will be abolished and workingmen's eight for a quarter tickets will also be done away with on June 21. While the court order fixed the fare on all lines at 5 cents, President Brooks of the company instructed the employees to accept outstanding workingmen's tickets and tickets of the so-called 3-cent lines for full fare the same as previously until midnight, June 21.

### INCREASES FOR OTHERS LIKELY

In line with the increases granted the 3000 platform men, who operate the cars, it is expected that employees of the company serving in other departments will be granted increases also. The combined wage increases have been estimated as adding more than $1,000,000 to the annual operating expenses of the company.

The company has announced it intends to charge only one 5-cent fare to North Detroit in the future, instead of two, as has been collected previously. The city was also notified that the company would comply with the Council resolution and proceed with the Twelfth Street and St. Jean Avenue extensions.

The special election on the $10,000,000 bond issue to provide funds for beginning a municipal railway system will be called early in August instead of July 22, as formerly planned. The fact that the Council must specify in the resolution and ordinances fixing the election, that money will be raised for extensions and purchase of the day-to-day agreement lines, makes the postponement necessary.

### COUNCIL HAS APPROVED NEW FARES

The Council approved the 5-cent fare agreement reached with the railway by Mayor Couzens and Corporation Counsel Wilcox. A resolution calling for the appointment by the Council of the city's arbitrators to the board was passed. The board will determine after three months whether the company needs to charge 1 cent for transfers. It is expected that the board of arbitrators will be named in the very near future.

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## Strike at Lowell, Mass.

The lines of the Lowell (Mass.) division of the Eastern Massachusetts Street Railway were shut down by a strike which began on June 16, the cause being the introduction of a hand fare register. The strike took place in violation of the agreement of the employees' union to arbitrate all matters in dispute, and the chief bone of contention was the attempted use of these registers by conductors on open cars.

Thomas Lees, manager of the Lowell division, issued a statement early in the day, pointing out that the employees had disregarded their agreement and expressing the company's regret at the inconvenience caused the public by the walkout. Later in the day the public trustees of the company issued the following statement over the signature of Homer Loring, chairman of the board:

> This is not only a strike by the Lowell employees in violation of the existing arbitration agreement, but it is an attempt on the part of these employees to control the matter of collecting fares. The fare register, against which the strike is directed, insures two things—first, that the passenger pays his fare, and, second, that the company gets it after it is paid. Its use on many large lines has been personally investigated by the trustees, who are firmly of the opinion that such use is beneficial alike to patrons, employees and owners.
>
> The Legislature has placed on the trustees certain very definite responsibilities as to administrative and operative duties, and if we are to allow the men to dictate the method of collecting fares we are shirking a major responsibility at the outset.
>
> We regret the inconvenience to the people of Lowell, and the loss of revenue both to the company and the men, but the issue must be squarely met—our conductors in Lowell cannot be allowed to decide what system of fare collection the company shall adopt.

## Comment Worth Pondering

### Minneapolis "Journal" Talks from Shoulder on Local Traction Situation

The Minneapolis *Journal* says service is paramount in any settlement of traction affairs there. In some quarters the effort has been made to befuddle the issue as contrasted between that city and St. Paul, in both of which the Twin City Rapid Transit Company operates, but the *Journal* refuses to be beguiled. In a recent public debate it was contended that it is unwise to adopt a cost-of-service franchise in Minneapolis on a basis of 7 per cent return on a valuation of $24,000,000, because that would mean a 6-cent or 7-cent fare in Minneapolis, while St. Paul, with a franchise guaranteeing a 5-cent fare and eighteen years to run, would have an intolerable advantage. In replying to this argument the *Journal* pubished the following comment:

> One trouble with this argument is that it assumes the rate of fare to be the paramount consideration. But if Minneapolis had a 6-cent service, with plenty of cars running, with extensions built where necessary, while St. Paul struggled with a 5-cent service that meant cars crowded and infrequent and no extensions, how long does Mr. Keyes suppose St. Paul would stand for retention of her present franchise?
>
> In other words, service is more important than rate of fare—more important to the individual car-rider, and more important to a growing city which cannot permit its development to be stunted by lack of transportation facilities.
>
> Since it is probably not practicable for the two cities to act together in arriving at a settlement, and since the State cannot step in, it follows that one of the cities must take the lead and make a settlement. The other will follow very quickly. If Minneapolis is to postpone settlement just because St. Paul has a 5-cent franchise running till 1937, must she put up with the present pinched service for the next eighteen years?
>
> The 5-cent fare is throttling the development of both cities, because it is producing financial anemia in the company. There is great need for the transfusion of new capital into its veins in order to restore its health so that it can function properly. But no investor is going to submit himself to such an operation, unless it appears that the patient is to be properly nourished.
>
> This community would not need to concern itself greatly over the health or illness, the life or death, of the Twin City Rapid Transit Company, were it not for the service that corporation performs, or ought to perform for the community.
>
> Let us not permit the desire to "get the best" of the company in a bargain blind us to our own interests as a community. The chief thing that we need to consider in any new franchise is whether it will result in good service at the lowest cost compatible with sound financing. Service is the first consideration; as low a rate of fare as possible is the second.
>
> We believe the discussion is proceeding on right lines as to valuation and return. These are at the base of the question, and another checking, as is proposed, may clear it.
>
> The company must have enough to pay charges and standardize service. We believe 6 cents at the start is about established as a necessary fare.

# Winnipeg Completely Tied Up

## Upheaval in Canadian City Regarded as an Effort to Establish the Rule of the Soviet

For more than a month, Winnipeg, Man., a city of 200,000 people, has been in the throes of a general strike affecting 35,000 workers, aimed at depriving the city of its public utilities and necessities of life and acclaimed to be an attempt on the part of the radical leaders in control of the local Trades & Labor Council to establish the rule of the Soviet. The Ministers of the Crown have described the strike as a revolutionary attempt to overturn governmental authority and to supplant sane, progressive trade unionism with the idea of one big union. This is akin to the I. W. W. and Bolshevist movement in other countries. That the strike has extended over so long a period is due to the wholehearted manner in which the citizens have banded together in an effort to defeat the movement.

A dispute between metal trades employers and employees was seized upon by the Trades & Labor Council as the *casus belli*. The metal trades employers, while being prepared to negotiate schedules, with committees of their own employees or international representatives of the latter, refused to recognize the Metal Trades Council—a combination of unions including several with which the metal trades employers had no dealings and nothing to discuss. The Metal Trades Council, which is composed of very radical Socialists, insists on being recognized as the official negotiating body for all metal trades workers. The employers, however, refused to recognize any extraneous body.

### WILL NOT ARBITRATE A PRINCIPLE

In spite of the fact that the employers of labor were prepared to negotiate with unions or committees of their own employees the Metal Trades Council received the support of the Trades & Labor Council on the plea that "the employers refused to recognize the principle of collective bargaining," and in order to force the employers to accept the definition of collective bargaining as drawn up by the Metal Trades Council, a general sympathetic strike of all unions, including firemen and policemen, associated with the Trades & Labor Council, was called. The strike leaders, holding that they could not arbitrate a principle, which in this case was collective bargaining, refused to arbitrate. They struck on May 15.

Incensed at the attempt to deprive the city of fire and police protection, urban transportation, water, light, milk and bread, etc., the citizens have banded together into a "committee of one thousand" and have issued the edict that before a settlement of the metal trades dispute is made the question of the sympathetic strike must be settled once and for all.

Volunteer forces were organized to man the police and fire brigades, the light and water plants, and the milk plants and bakeries. Having thus successfully nullified the attempt of the strike committee to reduce the city to starvation, the citizens have expressed determination that the sympathetic strike weapon, as it applies to various utilities, shall not be resorted to every time there is a dispute between a private employer and his employees. Permanent staffs for the fire, police, and other utility departments have to sign a "loyalty" oath before being taken on, in which they declare they will not become members of any union affiliated with an outside body, and that they will not participate in sympathetic strikes.

### EFFECT ON WINNIPEG ELECTRIC RAILWAY

So much for the general situation. It seemed to be essential to an intelligent understanding of the effect of the strike on the Winnipeg Electric Railway, which operates light, power, gas, and transportation utilities, that the movement be reviewed very briefly in its wider phases. Fortunately the railway was able to keep its light and power and gas plants in full service, but transportation has been completely tied up since May 15. The 1700 motormen, conductors, and shop employees struck in sympathy with the metal trades employees and not through any dispute with the company.

At the time the strike on the Winnipeg Electric Railway was called a board of conciliation was engaged in arbitrating the demands of the motormen and conductors for 70 cents an hour (maximum) and an eight-hour day. Several sessions of this board had been held, but A. Scoble, business agent of the railway union, had told the board that unless the demands of the men were met they would go out on strike. The union refused to name a representative to the board, and refused to put in "its case." Three days before the sympathetic strike was called the railway men were asked, by their union officials, to vote on the question: "Are you in favor of a strike to enforce your demands." Reference was made to conciliation, and the result of the vote was 97 per cent in favor of a strike. No vote was taken on the sympathetic strike issue, but the men responded to the call of the Trades & Labor Council and went out on strike on the morning of May 15. Meantime the board of conciliation investigating the men's demands has suspended sessions until the strike is over.

No action was taken with regard to resuming railway service until June 9 when the City Council of Winnipeg passed a resolution requesting the company to operate cars immediately. Several conferences were held between officials of the company and the city with regard to the provision of police protection. In response to the demand of the City Council, A. W. McLimont, vice-president and general manager of the Winnipeg Electric Railway, published an advertisement in all local papers asking the men to report for work at their respective carhouses at 8 a.m. on June 12. This advertisement closed with the following appeal:

> I wish to convey to you men my personal feeling that you are not now aiding the cause for which the general strike was called by continuing to deprive the people of Winnipeg of transportation. On the contrary, you are injuring your personal standing in the community and getting the authorities and the public alike down upon the employees of the Winnipeg Electric Railway. Remaining on strike now only results in seriously injuring the company which employs you and depriving it of revenue it must have to conduct its business and provide the wherewithal to pay your wages in order that you in turn may support your families and yourselves.

On June 11 members of the railway union held a meeting to consider this new development, and after discussion they decided unanimously to remain out on strike in sympathy with the other workers. Strong pickets were placed at the respective carhouses the following morning, and only two employees reported for duty. Resumption of service, of course, was impossible.

In a letter to Mr. McLimont, the president of the railway union, said:

> We appreciate the spirit in which your letter is couched and we hope that in the very near future we will be able to resume our former positions, and continue our past amicable relationship, and we would request that you use your good offices with the many other influential interests that are working with the object in view of restoring to our fair city of Winnipeg that spirit of good fellowship and brotherly love that should permeate every man and woman that has the welfare of the community at heart.
>
> Try with us to establish again the spirit "Do to others as we would have them do to us."

At a meeting of the City Council on June 14 the question was discussed of permitting jitneys to ply the streets just so long as the railway service was tied up. After discussion the city solicitor asked for time to study the question before making a statement as to what rights the city had to permit jitneys to run under the circumstances.

Fourteen cars were in operation on June 19 until sundown. They plied the principal thoroughfares and were greeted with cheers. No untoward incidents occurred. The company issued an ultimatum on June 18 to employees to return to work on June 19 which stated:

> The employees who do not report and are not available when required to enable the company to resume service will be replaced by permanent new employees and will lose their seniority. New employees taken into service will not be dismissed to make places for any old employees who may subsequently decide to return to duty.

Several regular employees responded. These men and supervisors and inspectors manned the fourteen cars in service. A mass meeting of the electric railway employees was set for June 19 to decide on future action. Eleven leaders of the general strike were arrested on June 18 charged with seditious conspiracy.

## Something to Think About

### George B. Cortelyou Advises Publicity, But Lays Stress on Adequate Service as Essential First

George B. Cortelyou, president of the Consolidated Gas Company, New York, and the American Gas Association, in an address before the joint meeting of the Natural Gas Association of America and the American Petroleum Institute, summed up the utility situation as follows:

> We hear much of the needs of the utilities. Presupposing that they are honestly and efficiently conducted, what is their greatest need to-day? Simply that they should have what we mean when we ask for a "square deal."

#### APOLOGETIC PUBLICITY CONDEMNED

> A public utility is a part of the community—an essential part—its personnel are citizens, taxpayers, business men, as surely as any others who bear those honorable names. Why should there be the discrimination that in many places exists in the public mind? Partly because of past mistakes, of the misdeeds of a few, of the exigencies of politics, of a variety of causes, but in my judgment quite largely because we have underestimated the inherent sense of fairness of the American people when they are informed, when they are in possession of the facts.
>
> We have not given them the facts. Much of our publicity has been of a halting, apologetic kind, as though we were on the defensive. I say to you, gentlemen, that the facts are with us—the nature of our business, the cost of conducting it, the burdensome restrictions put upon it, the lack of flexibility in its regulation, the part it plays in the life of every community. We must make every company in very truth a public utility and then see that the public is made to realize that it is. With this established, we have made progress toward adequate rates, enhanced credit and an ample and responsive market for our securities.
>
> How many American communities know even the general features of our business? Properly told it would be a most interesting story; in these days when so much stress is laid upon practical information, it would be eminently practical.
>
> And cost of production! Highly interesting, too; also, serious and well-nigh ruinous for some companies, but extremely instructive in itself and when compared with that of other products. Restrictions are probably necessary in some degree in all business, but does business thrive in proportion to the stringent character of these restrictions? Rather, does it not expand and realize the hopes of both producer and consumer alike in proportion to their tendency toward reasonableness?
>
> And that brings us to the absence of flexibility in public regulation. I undertake to say that much of the regulation of this character makes it impossible for the companies to render their best service. That is what each community wants from its utilities, the best service, and if it can be sure that the exactions put upon them are counter to its own best interests, we have prepared the way for sympathetic response to our just claims.
>
> The public is better informed of the part played by the utilities in the war than of their daily routine of business—and it was a splendid and essential part—but it seems to me that, aside from all other aspects, that most patriotic and creditable record is useful as a foundation for the diffusion of a more permanent understanding of their vital relations to all industrial activity.

#### HONEST MANAGEMENT AND HONEST SERVICE CONFOUND THE CROAKERS

> With a prompt and widespread resumption of business one of the most urgent demands of the country, and with governmental war restrictions lifted, why is not this a good time to acquaint the public with the part the utility can play in the business life of the community, if encouraged to its best efforts, and to look squarely in the face this deterrent influence of unnecessarily burdensome regulation?
>
> Many of us who believe thoroughly in the regulation of utilities, when it is administered fairly and impartially, feel that not a little of it is dispensed upon theories far removed from that wholesome conception.
>
> We must hasten the day when we shall, as great industries, take and maintain our place in American business life by the side of merchant and manufacturer and banker, and as surely and with as general acceptance. But back of all publicity must be adequate equipment, trained personnel, contented labor and a management alive to its responsibilities; for when the response comes to our announcements we must be ready to meet it in full measure.
>
> In our business nothing confounds hostile attacks so quickly as good service; nothing silences hasty criticism so thoroughly as honest and efficient management.

## Strike in Vancouver

### Demonstration There Another Manifestation of General Unrest Throughout Canada

Platform and shop men of the British Columbia Electric Railway's Vancouver and North Vancouver city systems ceased work on June 5 in a sympathetic strike, outbreaks of which have spread with revolutionary aspects throughout Western Canada.

The union took a ballot on June 1 and registered three to one against the sympathetic strike. The Trades & Labor Council of Vancouver held a mass meeting of all unions on June 2 and in spite of a majority of the unions of the city being against the strike, this council called upon the unions of the city to walk out on a general strike, the street railway men's and electrical workers' included.

#### STRIKE DECLARED JUNE 9

The strike in Vancouver began at 11 a.m. on June 9. The street railway men decided to hold a mass meeting the following night. In the meantime, strikers are alleged to have intimidated the car men with threats of violence if they did not quit work. It is felt certain that this was the cause of the street railway men at their mass meeting voting two to one in favor of a strike. On that occasion, only two-thirds of the men who had previously voted against the strike voted the same way, the others presumably having gone over to the other side.

On June 7 transportation was being provided by means of jitneys and private automobiles. The City Council of Vancouver repealed the by-law prohibiting jitneys for the time being, much to the anger of the strikers.

#### INTERURBAN LINES NOT AFFECTED

Cars were still being operated on all interurban lines on June 7. Central Park and Burnaby Lake lines are operating to their connections with city lines, the men being attached to the New Westminster trades and labor council, which has registered against a sympathetic strike. The New Westminster city system was also operating on June 7. The Fraser Valley and Lulu Island interurban lines continued service, the trainmen there being attached to the Brotherhood of Railway Trainmen, which is not countenancing the sympathetic strike.

The electrical workers voted to strike, but up to June 7 only the line men had gone out. The substation operators were still at work.

## Cleveland Men Want More

### Despite Recent Wage Settlement Men Still Restless—Company Wants Fare Limits Removed

The employees of the Cleveland (Ohio) Railway voted on June 11 to ask for an increase of 12 cents an hour in wages. They are now receiving 43 cents for the first three months' service, 46 cents for the next three months and 48 cents thereafter. The men contend that one of the conditions of the award made by the Federal War Labor Board is that the agreement under which they are now working may be reopened in order to increase the wages in proportion to the advance in the cost of living. The present agreement does not expire until May, 1920.

In an interview, John J. Stanley, president of the railway, announced that he would ask the Council to consider the advisability of making an additional operating appropriation of $1,500,000 annually to meet the increase in wages sought by the employees. About $1,000,000 of this would be taken in the increase the platform men have asked and he feels that, if this is granted, shop men and other employees should have a proportionate increase. When the demands of the men were presented to him, Mr. Stanley replied that he would consult the Council, inasmuch as it must furnish the money for any additional pay.

Mr. Stanley also suggested that the maximum rate of fare of 6 cents and 1 cent for transfer be stricken from the Tayler grant and that no maximum be specified on account of the uncertainty as to expenses. He further suggested that the return on the investment be advanced from 6 per cent to 7 per cent. Stockholders, he said, are receiving no increase on the money they have put into the company, although others concerned in the road have been thus favored.

## Short Strike on Boston & Worcester

Union employees of the Boston & Worcester Street Railway, Boston, Mass., struck on June 13 for about ten hours owing to the failure of the War Labor Board to establish a finding issued in January last which awarded a maximum wage of 47 cents an hour to platform men. Following the announcement of the board's award last winter a disagreement arose as to its handling, particularly in relation to expenses involved in the proceedings. Upon learning of the strike, which completely tied up the road and threw a heavy traffic over to the parallel Boston & Albany Railroad, the War Labor Board confirmed its award and service was resumed. Besides the through service between Boston and Worcester, local service in Marlboro, Hudson and Framingham was interrupted. About 250 employees were involved. The award is retroactive to Nov. 1, 1918, but the total amount which it involves has not yet been determined.

### Illinois Commission Enlarged

With the adjournment of the Legislature of Illinois only a few days away, members of the House took action on June 12 which sent to the discard all the bills which were intended to pave the way for improved transportation facilities in Chicago. With the next legislative session two years distant, this means that no permanent settlement of the traction problem can be made meanwhile even though the City Council may pass an ordinance which will need new statutes to make it effective. These bills appeared to have the support of all factions in Chicago, but they were presented at Springfield too late for thorough discussion.

On the same day that these bills were rejected, the Senate passed the House bill which increases the size of the State Utilities Commission to seven members. It is expected that three of the commissioners will devote their entire attention to Chicago matters, leaving three others to look after downstate matters.

### Rapid Transit Loop Construction to Begin

At a meeting of the Board of Rapid Transit Commissioners in Cincinnati, Ohio, it was made known that construction work on the proposed rapid transit loop will begin on July 1, when a dam will be built at the canal spillway in Cumminsville to divert the water in the canal from its course.

Chief Engineer Krug reported to the commission that as soon as the dam is built the first contracts to be let should be that portion of the canal subway from Canal and Walnut Streets to Plum and Liberty Streets, as this portion must be built before any work on the parkway can be done. The cost of the loop is estimated to be $1,191,800. The initial issue of bonds for the canal section will be $1,200,000.

The following resolution was adopted:

> To correct any misunderstanding that may be in the public mind the Board of Rapid Transit Commissioners states that the commission was appointed to build the rapid transit project as a whole. It can do nothing else. The first part to be built will be that section of the route now occupied by the canal. It is the intention of the commission to proceed with the building of the balance of the route just as soon as possible.

### Toledo and Cincinnati Wage Awards

The War Labor Board has announced its decision in the Toledo controversy. Motormen and conductors in the employ of the Toledo Railway & Light Company are allowed a wage scale of 42 cents an hour for the first three months, 44 cents an hour for the next nine months and 46 cents thereafter.

All other employees are allowed a straight wage increase of 8 cents an hour. As both the Toledo Railways & Light Company and its employees agreed in advance to abide by the board's decision the new wage rates become effective immediately.

The board has also sustained a ruling of one of its sub-committees that the Cincinnati Traction Company must pay 700 of its miscellaneous employees increases which will put their wages on a scale ranging from 42½ cents to 57½ cents an hour. The company protested the ruling on the ground that this scale would give the miscellaneous employees a higher average than motormen and conductors. The board suggests that this inequality could be easily remedied by granting the motormen and conductors a corresponding increase.

### Look Before You Leap

The Winnipeg (Man.) Electric Railway is carrying on a good steady work for safety. Here are a few epigrams taken from that company's bi-monthly *Public Service News.*

> The cost of safety is only a thought.  
> Before the accident, think,  
> And then, without a doubt  
> There will not be an accident  
> For you to think about.
>
> Far better for automobilists to wait a minute at a crossing than forever at a cemetery.
>
> A bed at home is worth two in the hospital.
>
> There was a man who fancied that by driving good and fast  
> He'd get his auto 'cross the track before the car came past;  
> He'd miss the fender by an inch and make the car crew sore—  
> There WAS a man who fancied this—he doesn't any more.

### Wage Arbitration Under Way

Patrons of the Pittsburgh (Pa.) Railways are face to face with the probability of an 8-cent fare as a result of the War Labor Board hearing on the wages conducted in Pittsburgh on June 16 and 17 by Charlton Ogburn, transportation examiner of the board. Testimony offered at the hearing made it very plain to the public that if the men get the increase of 12 cents an hour they demand, the money to pay it must come directly out of the riders' pockets in the shape of a fare increase, and opinion of witnesses was that 8 cents must be the new figure in the high fare area. No opinion was expressed as to what charge would result in the present 5-cent area. Five cents is charged now in a district of a radius of approximately 2 miles from the downtown termini, and 7 cents for a ride any part of which passes outside that area.

Concluding arguments in the case will be heard before William H. Taft and Basil M. Manly, joint chairmen of the board, in Washington the latter part of the week ended June 28, it was announced at the conclusion of the Pittsburgh hearing. The decision of the board is expected within two weeks thereafter. This decision, however, will not be final, as any award made the men must be approved by the United States court of the Western Pennsylvania district, under which receivers are operating the Pittsburgh Railways. By the terms of the agreement which terminated the May strike of the men, refusal of the court to aprove an award in their favor will leave them free to strike again.

### Co-ordinate All Transportation

Transportation throughout the United States is being hampered by a superfluity of governmental boards, all seemingly working for the same purpose, but independently and without co-ordination, in the opinion of Maj.-Gen. William M. Black who arrived at St. Louis on June 16 to let contracts for the construction of steel towboats. The St. Louis press quotes Major-General Black as follows:

> I am quite convinced that business cannot receive the best results from the agency it depends on most—transportation—until steam, electric, water and all other forms of transportation are put under one departmental head.
>
> All must be co-ordinated, so that transportation as a whole will do the greatest possible good for the country. In my judgment, this is impossible under present conditions, no matter what artificial aids are given one agency.
>
> To-day a separate government organization has control of water transportation, another has control of the railroads, and all told, there are about half a dozen boards doing work that should be done under one head. This kind of management cannot result to the best advantage any more than in a municipal government.
>
> Transportation is the most important element in the business life of America, yet the railroads, important as they are, are being hampered by legislation—because of the will of the people more than any other agency. The Standard Oil Company and the beef trust are little criticised to-day compared with the railroads.

### Joyless Jersey Jitneys

They are planning to take the joy out of the Jersey jitneys. Atlantic City may be the world's playground, Jersey City and Camden, to those who do not live there, may seem to be the world's dumping grounds and Jersey commuters may continue to take money out of New York City and Philadelphia and horde it in New Jersey, but in Jersey a contract is a contract. Jersey City says so, and it intends to act to that end.

But to begin at the beginning again. Jersey City is up in arms against the jitney. Not only is it threatening dire things, but it is doing them. And the jitneurs, as they call them in Jersey, are quaking in their seats, as their rough-riding Fords pound down the pavement, with Jersey justice hot on their trail. At one fell swoop eighty-eight jitneurs, members of the clan that is said to have taken $4,000,000 away from the Public Service Railway, were jugged recently for charging a 10-cent fare on Bergen Avenue in Jersey City.

That city fixed a 5-cent fare for the jitneys. But some time ago the jitney men, avowing that they could not make the service pay at 5 cents, began to charge 10 cents. The arrests followed. Just as the culprits were about to be arraigned in court the jitneurs recalled that there was such a thing as a writ of certiorari. Armed with this they restrained the chief of police for the time being from requiring the jitney men to appear before the City Commissioners for the purpose of showing why their licenses should not be revoked for overcharging. And there the matter rests, or did rest, when this account was written.

# News Notes

**New Franchise at Paducah.**—A new and more liberal franchise was auctioned off on June 6, at Paducah, Ky., and was purchased by the Paducah Traction Company.

**Carhouse to Be Moved.**—The Northwestern Ohio Railway & Power Company has announced that its carhouse will be moved from Genoa to Oak Harbor, Ohio.

**Want $5 for an Eight-Hour Day.**—The employees of the Worcester (Mass.) Consolidated Street Railway have voted unanimously to reject the company's proposal to retain the employees of the railway on a platform-time basis. The employees insist on their demand for an eight-hour day with a straight wage of $5.

**Receiver's Compensation Fixed.**—The United States District Court has allowed Wallace Donham $50,000 as final compensation for services as receiver for the Bay State Street Railway, Boston, Mass., from Dec. 12, 1917, to May 31, 1919, in addition to the salary which he received at the rate of $15,000 a year.

**Supervisor on Inspection Tour.**—Lynn B. Milam, supervisor of public utilities of Dallas, Tex., has gone to Salt Lake City, San Francisco, Los Angeles, Portland, Seattle, St. Paul, Minneapolis and Cleveland for the purpose of investigating the city railways in these cities with a view to improving service at Dallas.

**Railway Office Robbed.** — Bandits entered the office of the Cleveland, Southwestern & Columbus Railway at Seville early on June 9 and, after binding the night watchman and two other men who were in the station, blew open the safe with dynamite. They secured about $1,000 in cash and escaped in an automobile.

**Bridge Service Unprofitable.**—William O. Wood, president of the New York & Queens County Railway, Long Island City, N. Y., has informed Borough President Connolly that his company would be unable to continue to operate across the Queensborough Bridge after Dec. 16 next unless there was a modification of the contract between the company and the city.

**Seattle to Operate Buses.**—The City Council of Seattle, Wash., has authorized Thomas F. Murphine, superintendent of public utilities, in charge of the Seattle Municipal Railway to operate a bus service to and through Carleton Park, Magnolia Bluff, from the end of the city car line at Fifteenth Avenue, N. W., and West Wheeler Street. Property owners will provide the buses, and the city will undertake their operation provided they are satisfactory and can be operated on a basis that will pay their expense.

**Improper Diversion of Funds.**—Assistant Attorney General Packard of North Dakota on June 7 ruled that the extension to the Capitol Car Line, operated by the State from the inland station at Bismarck to the Capitol, for which the last Assembly appropriated $40,000 from the Capitol Building's funds, cannot be built with these public moneys. To use the Capitol Building fund for this purpose, the Assistant Attorney General holds, would be an improper diversion of funds. The opinion was furnished at the request of the board of control.

**Company Makes Liberal Franchise Offers.**—In order to reach a settlement with the Commissioners of Stark County in the controversy over the Canton-Massillon line, the Northern Ohio Traction & Light Company is said to have agreed to a 10-cent fare, to build double tracks between Canton and Massillon, to pay the county $75,000 toward the improvement of the north side of the roadway, to provide crossovers at frequent intervals and to pay for a curb on each side of the proposed double tracks.

**Transit Director Urges Legislation.**—To obtain funds to complete the Frankford elevated line in Philadelphia, Pa., Director Twining, of the department of city transit, urges passage of the Salus bill by the Legislature. This measure would permit the transfer of funds which could be used for completion of the Frankford line on June 13. Director Twining said the bill was in the hands of a sub-committee of the House, and that unless the measure should be reported immediately with a favorable recommendation, it would not be possible to pass it.

**This Fellow No Piker.**—An interesting case came up in Louisville during the finals of the spring races, when Butler Welsh, motorman, and John Bohon, conductor, on a Barrett Avenue car of the Louisville Railway were held up and robbed of their watches and cash shortly before ten o'clock at the loop. A few days later the watches, money and interest of $2 was sent to Samuel Riddle, superintendent of transportation of the railway, with a request that he turn it back to the car men. The sender stated in the letter that he went broke on the races and had to have cash to get going again. Apparently he picked a winner and got off of his uppers.

**Conductorettes in Manila.**—Filipino girls have recently taken jobs as "conductorettes" on the new autobus lines established at Manila to supplement the wartime shortage of street cars in that city. In spite of the initial shock conveyed to the conservative element of the island people at the appearance of native girls in positions hitherto filled exclusively by men, information reaching the United States department of labor indicates that the experiment has been pronounced a marked success, the directors of the company having expressed themselves as being highly gratified with the results, and the girls equally delighted.

**No Home Rule in Illinois.**—The proposed home rule legislation in Illinois was killed by both the Senate and the House. The Senate committee on public utilities laid the proposed bill on the table by a vote of thirteen to nine and reported out a bill by the committee increasing the membership of the commission to seven members. The House committee on public utilities reported out the home rule bill and the bills validating franchise ordinances with the recommendation that they do not pass. This recommendation was approved by the House by a vote of eighty-four to fifty-three. The above action insures that there will be no change in the public utilities laws affecting the jurisdiction of the Illinois Commission.

**Toronto Men Want More.**—In view of the wage increases demanded by employees of the Toronto (Ont.) Railway and the company's statement that it is financially unable to grant these increases, Mayor Church will confer with representatives of the Ontario government, the Ontario Railway Board and the railway in an effort to avoid a deadlock. The Mayor has stated that the city would not consent to any increase in the fares of the company, nor would the railway be taken over until 1921. He suggested that any dispute arising from the demands of the men should be settled by arbitration and conciliation. A committee representing the union will meet Manager Fleming of the railway to present their demands to him. These include an eight-hour day, pay at the rate of 55 cents an hour, and several minor changes.

**Wage Arbitration Proposed.**—The Des Moines (Ia.) City Railway has made application to the federal court for permission to arbitrate the proposed wage increases asked by the employees. Permission from the Federal Court is necessary on account of the fact that the company is being operated by receivers. The proposed schedule provides for a sliding scale of wages for trainmen as follows: first three months of service, 14 cents an hour increase over present scale; for men between three months and one year service 16 cents an hour increase; more than one year's service 18 cents an hour increase. For brake and pipe workers a straight increase of 30 cents is asked. For men in the paint shops an increase of 18 cents is asked and the carhouse and power house employees ask for 10 cents an hour. If the schedule is approved by the court it will go into effect on March 1, 1920. Judge Wade has set June 24 for the hearing on the request.

# Financial and Corporate

## Special Master in Rhode Island

### R. E. Lyman Designated to Untangle Maze of Complications at Providence

Richard E. Lyman has been appointed master in chancery, and the receivers of the Rhode Island Company, Providence, R. I., have been given temporary directions for operation of the company by Presiding Justice Tanner in the Rhode Island Superior Court. Mr. Lyman was ordered to untangle the maze of complications into which the road's affairs have developed.

#### COURT INSTRUCTS RECEIVERS

The receivers, by virtue of the decree entered following a hearing, were authorized to pay the federal revenue taxes, to pay rentals of the Rhode Island Company to the United Traction & Electric Company, the amount to be determined by the master, and meanwhile to operate the lines, paying the traction company, the lessors of the property, at the rate of 3 cents per car-mile per month.

The master in chancery was ordered to determine and report to the court: The sum for rentals to be paid the United Traction & Electric Company from Jan. 30, the date of appointment of a temporary receiver, to April 21, when the court decreed leases terminated; the amount to be paid the receivers for operating expenses; the monthly compensation to be paid the lessor companies for rentals, beginning on April 21; the exact disposition of properties of the lessors and any losses resulting from neglect or breach of lease terms; and the exact ownership of all property, lines, equipment and rights-of-way, etc., composing the system.

The master was also empowered by the court, under the decree, to hire such engineers and accountants as might be necessary to aid in a proper determination of all the issues referred to him, and was directed to report to the court on each issue involved as soon as possible.

#### EAST SIDE TUNNEL A PROBLEM

Chief among the ownership problems to be settled is that relating to the East Side tunnel. The many other financial difficulties due to operation of the lines owned by several different companies and leased by the Rhode Island Company, and sale and exchange and improvements are likewise left to the master to untangle.

Eugene A. Kingman of Edwards & Angell represented the United Traction Company and Clifford Whipple, the receivers when the matter of the decree came before Presiding Justice Tanner, on petition filed by the lessor companies. There was no opposition to the terms of the decree, which had been discussed and agreed upon beforehand. The appointment of the master and thus the settlement of ownership questions became necessary when the leases of the Rhode Island Company were declared by the court on May 14 to have terminated by default of payment. The decree entered therefore was only the logical outcome of the decision previously made.

Not only are the receivers to retain control and operate the Rhode Island Company system under the decree, but they are given 3 cents per car-mile per month as the rate of compensation to be paid the lessors until such time as the master shall determine "a fair and reasonable" rate for such rentals. When the master has ascertained what the rate shall be it will be retroactive to April 21, according to the court's order.

The decree empowers the master to hear such evidence as may be presented by those concerned in the affairs of the company and to apply to the court for final authorization in employment of accountants and engineers or other needed assistants.

The decree also directs the master to make his report on the various questions as if each was embraced in a separate decree, the purpose of this being to expedite settlement of the sundry problems, and states lastly "all parties in interest are given leave to apply to the court as the occasion may arise."

## Rhode Island Results Improve

The deficit for April of the Rhode Island Company, Providence, R. I., is placed at $61,169, according to a report filed with the Public Service Commission by Comptroller C. A. Babcock. This deficit, however, indicates an improvement in operating conditions inasmuch as it was less by $30,294 than the deficit for March.

An increase in passenger receipts of $93,086, or 21.38 per cent over the corresponding month of 1918. This result was obtained despite a drastic curtailment of service, the receivers of the company reducing the car-miles to the extent of 149,059.

The total net income for the first four months of the year was $378,908, an increase over the corresponding period of 1918 of $8,864.

The total deficit for the four months was $324,225, an increase of $4,326. To judge from past figures and the prospects for the future, a deficit of $1,000,000 before the expiration of the year is not unlikely.

## Temporary Receiver

### Subsidiary of the Rhode Island Company Placed in Hands of C. S. Sweetland

Upon petition of the Central Trust Company, New York, Cornelius S. Sweetland, Providence, R. I., has been appointed by Presiding Justice Tanner of the Superior Court, temporary receiver of the United Traction & Electric Company, a New Jersey corporation with its entire holdings in the State of Rhode Island. The Central Trust Company alleged default in the payment of taxes due in 1918, insolvency, etc.

#### REASONS FOR ACTION

It is contended in the petition that the United Traction & Electric Company issued on March 1, 1893, first collateral mortgage bonds to the amount of $8,000,000, payable on March 1, 1933, and bearing interest at the rate of 5 per cent, payable semi-annually on March 1 and Sept. 1 of each year. These bonds are secured by 19,341 shares of the stock of the Union Railroad, 1276 shares of the Pawtucket Street Railway and bonds of the Union Railroad and later, before June 24, 1902, all the outstanding capital stock of these companies and of the Providence Cable Tramway.

The assets of the United Traction & Electric Company not covered by the mortgage to the complainant trust company consist of 50,000 shares of the capital stock of the Rhode Island Suburban Railroad, of claims against the Rhode Island Company and the receivers thereof and of certain moneys deposited for the payment of interest due on bonds, it is stated.

If the interest due on March 1, 1919, is not paid on or before Sept. 1, 1919, the principal of the bonds may be declared immediately due and payable. Suits and attachments against the property of the United Traction & Electric Company might be started by creditors with the purpose of obtaining early judgment and securing priority for their claims, it is pointed out, unless the court enjoined such proceedings and appointed a receiver. The property might also be sold to pay the taxes due. For these and other reasons, that the creditors may secure equal protection, the petition for the receiver was filed.

#### RECEIVER APPOINTED

Presiding Justice Tanner entered a decree appointing Cornelius S. Sweetland temporary receiver and enjoining all parties from bringing suits against or levying attachments upon the United Traction & Electric Company. The temporary receiver was authorized to take possession of the property and assets of the resident corporation and was required to file within ten days a bond for $25,000. June 23 was the date set for a hearing on the appointment of a permanent receiver.

## Merger Before Commission

### Indianapolis Companies Seek Sanction of State to Carry Out Plan Approved by Stockholders

Following the approval by the majority stockholders of the merger of the properties of the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company, as reported in the ELECTRIC RAILWAY JOURNAL for June 7, page 1118, a hearing was conducted by the Public Service Commission of Indiana on June 11 and 12 on the petition of the officers of both companies asking that the commission approve the merger agreement.

While the hearing was going on before the commission, a group of minority stockholders of the Indianapolis Street Railway filed a petition in the Marion Circuit Court asking for a permanent injunction against the merging of the two properties, and demanding a cancellation of the lease of the street railway by the terminal company. The officers and directors of both of these companies, as well as of the Terre Haute, Indianapolis & Eastern Traction Company, are named in the suit. The attorneys representing the minority stockholders are the same as sought to prevent the sanction of the merger agreement at the stockholders' meeting on June 2.

#### SAVINGS UNDER MERGER

During the hearing before the commission on June 11 Robert I. Todd, president of the Indianapolis Traction & Terminal Company, testified that under the 5-cent fare the increase in receipts from Jan. 1 to date has averaged about $2500 a day. Mr. Todd stated that at the present increase in traffic, the gross receipts for the Indianapolis city property, not including revenues from the interurban passenger and freight terminals, will be about $4,500,000 for the year 1919.

Mr. Todd informed the commission that with the operating expenses at 70 per cent, on the basis of the foregoing figures there would remain a balance of $1,350,000 from which would have to be deducted the interest on all bonds, payments into sinking funds, the $300,000 dividend paid as rental on the Indianapolis Street Railway property, interest on car trusts and floating indebtedness, which would amount to a total of about $1,290,000, leaving a net balance of approximately $60,000. If the proposed merger is approved, however, Mr. Todd pointed out that there would be a greater net revenue for the year 1919, as under the agreement the Indianapolis Street Railway stockholders would give up five months' dividends on their stock, which would reduce the annual payment to $175,000 this year.

Mr. Todd then explained that the proposed merger also contemplates omitting the payment of $120,000 annually into sinking funds for a period of two years. The reorganized company would, therefore, have about $300,000 out of this year's revenues to expend on repairs and betterments to the property. The improvements contemplated by the management in case the merger is approved would cost approximately $700,000 to $800,000. This would include the immediate purchase of twenty-five new cars.

#### CREDIT FOR GOOD MANAGEMENT

Commissioner Haynes thought that where a company could operate on a 5-cent fare, as had been the case in Indianapolis, and give reasonably good service to the public, it deserved more than ordinary comment and justified the assumption that its business affairs and management have been very efficiently handled.

Samuel Ashby, corporation counsel for the city of Indianapolis, entered an appearance for the city at the hearing. He stated that the companies had the legal right to merge and reorganize—that as to the contract agreement, he thought it absolutely fair, and as a street railway stockholder would be in favor of it. He explained, however, that he was opposed to the merger on the ground that the commission's approval of it would carry also the judgment that the property was worth the total issue of $24,000,000 of securities. He stated that if the commission decides to approve the merger, the city will insist that a stipulation be written into the order that the commission's approval would in no way validate the entire $24,000,000 securities of the consolidated company. Mr. Ashby had no suggestion to offer as to how it would be possible to reduce the securities of the company under the proposed merger agreement.

#### REDUCTION IN SECURITIES

In answer to a question of the commission, Mr. Latta, one of the attorneys for the terminal company, said that the reduction in securities provided in the merger agreement conformed with the order of the Public Service Commission made last December. He stated that the merger agreement was made under the 1899 law of the State of Indiana as amended in 1903, authorizing a merger on "such terms as may be by them (the constituent companies) mutually agreed upon." Chairman Lewis asked whether there was not a law limiting the preferred stock to one-half the capital. (Under the merger the preferred stock is $5,000,000 while the common stock has been reduced from $5,000,000 to $2,500,000.) Mr. Latta replied that the law referred to did not apply, as the petitioners were not proceeding under the general provisions of the public utility act of 1913 in regard to the issue of securities; that they were not asking for permission to issue any new stock, but simply to secure a merger of the present stock. The hearing on the suit for an injunction will probably be heard on June 25.

## Mostly About Power Contracts

The testimony of former and present directors of the United Railways, St. Louis, Mo., principally concerning power contracts, took up the greater part of the proceedings during the week ended June 14 in the receivership suit of John W. Seaman, New York, against the railway before Special Master Lamm.

Late on June 10 John I. Beggs, director of the United Railways and of the North American Company, and former president of the United Railways, took the witness stand on the call of the defense. In reply to a question by counsel Mr. Beggs said his business was "rehabilitating broken down plants." Mr. Beggs had hardly completed giving an account of his career when the hearing was adjourned for the day.

Another development of the day was the introduction of a copy of a hitherto unmentioned power contract between the United Railways and the Union Electric Light & Power Company, St. Louis, whereby the latter agreed to furnish any portion of surplus power received from Keokuk that the United Railways desired at 4 mills per kilowatt-hour. The plaintiff's petition alleged that a contract made early in 1918 charged the United Railways at the rate of 9 cents per kilowatt-hour. The contract introduced on June 10 during the testimony of W. E. Bryan, superintendent of power plants for the United Railways, it was testified, was made in April, 1918.

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## Mount Vernon's Abandonment

The Knox County Court of Appeals was reversed by the Supreme Court of Ohio on May 13 in its holding that the firm of Berman & Reed had the right to remove the railway rails at Mount Vernon without restoring the streets to their original condition.

The railway at Mount Vernon never was profitable. Finally the tracks were sold to Berman & Reed. That firm started to wreck the property, but was prevented from tearing up the line by an injunction suit in which it was sought to compel the new owners to give bond to insure the city that the streets would be restored to their original condition, if torn up. This case went through all the lower courts, with decisions against the city.

In passing on the question the Supreme Court ruled that the streets are held in trust for the public and are to be kept open. Rights in streets or highways granted to public service corporations are at all times held in subordination to the superior rights of the public, the court ruled.

The municipality, in contracting, has not the same capacity in giving its property as an individual, and there can be no implication that the streets may be left in a torn-up condition, according to this decision. It is held further that, as there was no adequate remedy at law, the resort to injunction is proper.

## Key System Deficit $219,626

### Report for 1918 Filed with Commission Shows Loss Despite Fare Increase

The San Francisco-Oakland Terminal Railways, Oakland, Cal., suffered a net loss of $219,626 for the calendar year 1918 and closed the year with a deficit of $751,126, according to the annual statement of the company just filed with the State Railroad Commission.

The net loss is recorded despite the fact that for the last six months of the year the company had the benefit of increased fares on both the Key and Traction systems. The commission early in June last year granted a 6-cent fare on the traction lines and an 11-cent fare for the transbay trip.

Railway operating revenue for the year amounted to $5,100,030, and railway operating expense totaled $4,025,876, leaving a net revenue from railway operation of $1,074,154. The gross income was $1,152,691, but deductions reached a total of $1,373,319, or $219,626 more than the gross income. The principal items making up the total deductions were $821,336 for interest on funded debt, $274,551 interest on unfunded debt, and $269,767 taxes on railway operations.

The detailed income statement for 1918 follows:

| | |
|---|---|
| Railway operating revenue | $5,100,030 |
| Railway operating expenses | 4,025,876 |
| Net revenue—railway operation | $1,074,154 |
| Auxiliary operations—net | 60,355 |
| Net operating revenue | $1,134,509 |
| Non-operating income | 18,183 |
| Gross income | $1,152,692 |
| Deductions: | |
| Rentals | $1,650 |
| Miscellaneous taxes | .......... |
| Taxes on railway operations | 269,768 |
| Interest on funded debt | 821,336 |
| Interest on unfunded debt | 274,552 |
| Miscellaneous deductions | 5,013 |
| Total deductions | $1,372,319 |
| Net loss for year | $219,626 |
| Debit balance year ended Dec. 31, 1917 | 375,764 |
| Miscellaneous additions 1918 | 22,451 |
| Miscellaneous deductions 1918 | 178,186 |
| Dividends | .......... |
| Appropriation to reserves | .......... |
| Deficit Dec. 31, 1918 | $751,126 |

## Hearing on Dissolution

The first hearing of Willard N. Baylis, as referee, to inquire into the condition of the Huntington (N. Y.) Railroad, operating from Halesite to Amityville, Long Island, was held on June 10. Referee Baylis is also to decide if it is to the best interest of the creditors and stockholders for the road to dissolve. At the meeting no opposition to the project to dissolve appeared.

Testimony was given favoring dissolution to the extent that the Long Island Railroad, which controls the property, had loaned up to Nov. 30, 1918, the amount of $609,319; that besides this there is a bonded indebtedness of $26,000, owned entirely by the Long Island Railroad, and that the capital stock is $30,000, owned by the Long Island Railroad with the exception of $1,000, which is owned by a private estate.

The testimony showed that since 1912 the revenue of the road has been constantly decreasing so that from $251,238 seven years ago it has dropped to $41,200, computed during the year of 1918. Against this the operating expenses during the year 1918 were shown to exceed the revenue by $16,650. Jitneys and automobiles were blamed for the decrease in the revenue. The hearing will be continued.

## Sale Unifies Power Supply

The Northern Virginia Power Company, Winchester, Va., has announced the sale of all the stock of that company to interests allied with the operation of public utilities in Western Maryland and parts of West Virginia. Between $1,500,000 and $2,000,000 is said to have been paid for the properties. The effect of the sale will be a unified system of the various plants of the Hagerstown & Frederick Railroad, the Potomac Light & Power Company, and the Northern Virginia Company. Physical connections will be made between the lines of the latter two, which operate half a dozen steam and water power plants.

Emory L. Coblentz, president of the Central Trust Company, Frederick, Md., is also president of the three companies. He states that the consolidation and elimination of competition assure efficient service. President Lewis F. Cooper and Directors E. V. Weems, S. L. Hoover and A. Moore of the Northern Virginia have resigned. The new board is composed of Emory L. Coblentz, Frederick, Md.; Shirley Carter, T. B. Patton and R. Gray Williams, Winchester; R. P. Chew, Charlestown, W. Va., and Harry C. Warden, Berryville, Va. Colonel Chew is vice-president, Mr. Williams general counsel, and Mr. Carter secretary and treasurer. M. A. Poole is general manager.

## T. H., I. & E. Feels War Costs

The gross earnings of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., in 1918 were $3,731,287 as compared with $3,386,364 in 1917, an increase of $334,923, or 10.8 per cent. Operating expenses for 1918 were $2,472,219, an increase of $334,746, or 18.43 per cent, over 1917. Net earnings in 1918 were $1,259,067 as compared with $1,298,891 in 1917, a decrease of $39,823. In 1917 taxes paid amounted to $179,362, these payments increasing in 1918 to $232,536. These figures reflect war conditions which prevailed in 1918, the heavy increase in cost of material and increased wages having more than absorbed the increase in gross earnings.

For maintenance of ways and structures $328,638 was spent in 1918, an increase of $40,629 over 1917. Maintenance of equipment cost $239,754, an increase of $47,154 over 1917. The company's interurban lines carried 8,603,196 passengers in 1918 and the city lines carried 12,984,413. The company handled a total of 108,416 tons of freight.

The Terre Haute, Indianapolis & Eastern Traction Company has made a speciality of transporting live stock, 705 carloads having been hauled to the Indianapolis market from surrounding towns. The freight on these amounted to $15,000. The carrying of hogs, sheep and cattle from points on the Crawfordsville division—principally from Crawfordsville, Linnsburg and Linton—which was begun in the winter of 1917-1918, continued during the whole of 1918 and proved to be a very profitable part of the freight business.

The restoration of peace conditions and the attendant welcome home celebrations and the like have added largely to the gross earnings from Jan. 1, 1919, to June 1, 1919, the increase being 20 per cent over the same period in 1918. Against this, however, is the still prevailing high cost of material and the increased wages, which absorb a large part of the increase in gross earnings.

## Chicago Elevated Unprepared to Redeem Notes

The National City Bank and the National City Company, New York, have decided that the situation of the $13,601,000 extended notes of the Chicago (Ill.) Elevated Railways is such that the formation of a protective committee is imperative. Hence the following committee has been chosen: C. E. Mitchell, president National City Company, New York, chairman; George M. Reynolds, president Continental & Commercial National Bank, Chicago; John H. Mason, president Commercial Trust Company, Philadelphia; T. Hartley Given, president Farmers' Deposit National Bank, Pittsburgh, and R. Floyd Clinch, of Crerar Clinch & Company, Chicago. Holders of the securities are invited to deposit their notes either with the National City Bank, New York, or with the Continental and Commercial Trust and Savings Bank, Chicago.

The Chicago Elevated Railway notes, which matured on July 1, 1918, and were extended, are again due July 1. The company, it is said, cannot pay them; although it has provided interest money due on July 1, there appear to be only two courses open to the noteholders — foreclosure or extension. Some of the Chicago holders have agreed that an extension should be accepted on the theory that the present management is better qualified to operate the property than any receiver or trustee.

When the notes were last extended the company paid a bonus of 1½ per cent, increased the interest from 5 to 6 per cent, and added to the security behind the notes by increasing collateral and by subordinating claims of the Commonwealth Edison Company. The company is represented to be in no position to repeat such concessions although confident of ability to meet interest payments.

# Financial News Notes

**Receiver Makes Road Pay.**—Harrison B. Freeman, receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn., has reported to Judge Haines in the Superior Court that since April 1 the road has been more than paying its operating expenses.

**Deposits Asked.**—The June 1 interest on the 5 per cent collateral trust notes of the Washington (D. C.) Utilities Company having been defaulted, a protective committee has requested the noteholders to deposit their notes with the Metropolitan Trust Company, New York, N. Y., or the American Security & Trust Company, Washington, D. C., depositaries.

**Payment of Interest Authorized.**—Judge Julius M. Mayer, of the United States District Court, has directed Job E. Hedges as receiver of the New York (N. Y.) Railways to pay the semi-annual installment of interest, $37,500, due on July 1 on the improvement and refunding mortgage 5 per cent bonds of the Twenty-third Street Railway and also to expend $23,625 in repairing the tracks of that line, besides settling certain tax bills.

**Mr. McCook Named Special B. R. T. Master.**—Judge Julius M. Mayer has entered an order in the United States District Court naming Philip J. McCook as a special master to pass upon tort claims to succeed to ex-Judge Van Vechten Veeder, who was appointed some weeks ago. There are claims amounting to more than $1,000,000 from the Malbone Street disaster alone and under the judge's ruling it will be necessary for them to be proved before a special master.

**1918 Results in London.**—The traffic receipts of the London County Council Tramways for the year ended March 31, 1919, were £3,479,154, an increase of £613,465 over the previous year. What the working expenses, etc., amount to will not be known exactly for some time, but for the preceding year the net surplus was only £95,559. The additional change owing to the adoption of the forty-eight-hour week is estimated at £360,000 a year.

**Offering of Commonwealth Notes.**—Bonbright & Company, New York, N. Y., are offering at prices ranging from 99 to 94 and interest, to yield from 7 to 7.55 per cent, according to maturities, $750,000 of secured serial 6 per cent gold notes of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., dated June 1, 1919, due serially, $100,000 annually, June 1, 1920, to 1923 inclusive, and $350,000 June 1, 1924.

**New West End Bond Issue.**—The Massachusetts Public Service Commission has approved the issuance by the West End Street Railway of $1,581,000 of coupon or registered bonds to be payable not exceeding thirty years from date thereof and to bear interest at not to exceed 7 per cent, for the purpose of refunding outstanding bonds which become due on Aug. 1.

**Cleveland Tax Value Boosted.**—The Ohio State Tax Commission has increased the valuation of the Cleveland Railway property $6,000,000. Secretary Henry J. Davies was in Columbus recently to file a protest against this increase. He said that car riders will be compelled to pay $96,000 more in fares to meet the tax on this sum, if it is allowed to stand. The new appraisal increases the valuation from $28,000,000 to $34,000,000. This is considered excessive.

**Car Trust Certificates in Maine.**—The Public Service Commission of Maine has authorized the Bangor Railway & Electric Company, Bangor, Me., to issue thirty-six promissory notes, each for the sum of $1,465.75, dated April 23, 1919, maturing monthly, interest at 6 per cent, secured by a car trust mortgage in a sum representing the aggregate of the notes and generally providing that the title to the cars shall not pass until the last of the notes shall have been paid.

**Offering of Two-Year Gold Notes.**—Bonbright & Company, New York, N. Y., are offering for subscription at 91½ and interest, to yield 7.30 per cent, $279,000 of bond-secured 7 per cent gold notes of the Arkansas Valley Railway, Light & Power Company dated June 1, 1918, and due Dec. 1, 1920. The bonds are redeemable as a whole or in part at any time after Dec. 1, 1919, at 100½ and interest. The proceeds from the sale of the notes will be used in part to refund $450,000 of 6 per cent notes which come due on July 1.

**Approves Increase in Operating Allowance.**—Following a request for an increase in the operation allowance of service-at-cost lines in Youngstown, Ohio, from 22 to 31 cents a mile, made two months ago by the Mahoning & Shenango Railway & Light Company, City Commissioner W. L. Sause advises a rate of 27 cents. Headed by Chairman J. C. Sullivan of the railway committee, some Councilmen oppose voting an increase in operating allowance, preferring to see the question arbitrated.

**Court Approves Lease.**—H. R. Freeman, receiver for the Hartford & Springfield Street Railway, Warehouse Point, Conn., has obtained from the court permission to lease from the New York, New Haven & Hartford Railroad 4¾ miles of the electric railway in Suffield, extending to the Massachusetts State line, with a view to securing an improved service. The lease is to run yearly until discontinued by either party giving thirty days' notice. The plan to negotiate the lease was referred to in the issue of the ELECTRIC RAILWAY JOUNRAL for June 14, page 1191.

**Wants Commission's Approval.**—The Selma (Ala.) Electric Railway has asked the Alabama Public Service Commission to approve the sale of the property and franchises of the Selma Traction Company to the Selma Electric Railway and also to approve the execution and delivery by the Selma Electric Railway of its bonds, aggregating $50,000, secured by a first mortgage on the franchises and property. A hearing will be held on the matter on July 7. The application is made in connection with the plans for a reorganization following sale under foreclosure, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL.

**Deposit Agreement Extended.**—More than three-fourths of the first mortgage 5 per cent bonds of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., due on Jan. 1, 1930, having been deposited under the deposit agreement dated Jan. 22, 1919, notice is given that additional bonds will be received without penalty until July 1, 1919, after which date no bonds will be accepted except under such terms as the committee may prescribe. James Timpson, vice-president of the Mutual Life Insurance Company, New York, N. Y., is chairman of the committee. The Central Union Trust Company, New York, N. Y., is depositary.

**Service Abandoned in Tiffin.**—The Tiffin, Fostoria & Eastern Electric Railway, which operates the city lines in Tiffin, Ohio, anounces that it will not resume operation of city cars, which have been out of service for some time. It is stated that the tracks will be torn up and all activity on the city line suspended. The reason assigned is that the company has lost an average of $400 a month for the last year in operating its city lines. Service was suspended once before, but later an arrangement was made with the city calling for a readjustment of fares under which service was restored. This matter has been referred to in the issues of the ELECTRIC RAILWAY JOURNAL for Aug. 17, Sept. 7, Oct. 12 and Dec. 14, 1918.

**To Vote Funds for Improvements.**—A special meeting of the common stockholders of the Nova Scotia Tramways & Power Company, Halifax, N. S., will be held on June 24, to authorize an issue of $2,000,000 unsecured three-year notes, of which half is to be put out upon approval by the Public Utilities Commission of Nova Scotia. Following this meeting preferred stockholders will meet to sanction the notes. Active management of the property has been turned over to Stone & Webster, Boston, Mass., according to A. S. Pratt, the newly-elected president. The proceeds of the proposed note issue are to be utilized to buy additional cars and other equipment and for improvements and repairs.

**Abandonment Threatened.**—Officials of the Reno (Nev.) Traction Company have declared to Mayor Stewart, members of the City Council and the State Industrial Commission that the Sparks line is the only paying line they have. They threaten to abandon all lines in Reno if the city insists on holding the corporation to the terms of the franchise in the matter of street improvements. Two propositions have been submitted to the City Council by the company. One is to abandon all the lines in the city of Reno and pay 3 per cent of the gross earnings of the Reno-Sparks line. The other proposition would continue the lines as at present, but under a new charter, removing the clauses requiring the company to pave certain portions of the streets in the city.

**Reorganization Plan Before Commission.**—Jesse H. Steinhart, counsel for the reorganization committee of the Oakland, Antioch & Eastern Railway system, Oakland, Cal., on June 2 outlined to President Edgerton of the Railroad Commission the details of the plan agreed upon for reorganizing and refinancing the roads. Three railroads are involved in this reorganization, viz.: the Oakland & Antioch, the Oakland, Antioch & Eastern, and the San Ramon Valley Railway companies. The plan which has been ratified by more than 92 per cent of the bondholders of the component roads contemplates the organization of a new corporation, to be known as the San Francisco, Oakland & Sacramento Railway. The proposed capitalization and the disposition of the securities of the new company have been reviewed previously in the ELECTRIC RAILWAY JOURNAL.

**Foreclosure Suit Brought.** — The Farmers Loan & Trust Company, New York, N. Y., as trustee, following the consent of Judge Julius M. Mayer, in the Federal District Court, has brought a foreclosure suit in the Federal Court against the New York Railways, Job E. Hedges, receiver, and the American Brake Shoe & Foundry Company. The action is based on an adjustment mortgage, dated Jan. 1, 1912, made to secure an issue of $33,000,000 of 5 per cent thirty-year income gold bonds. Default in the payment of interest on the bonds, of which $30,616,487 are outstanding, and that the company is insolvent and wholly unable to pay its debts, are alleged in the complaint. It is further asserted that property and premises covered by the adjustment mortgage are and constitute very inadequate securities for the payment of principal and interest on the bonds. The mortgage properties, it is explained, are so situated that they cannot be sold in parcels without great injury to the holders of the bonds and scrip secured by the mortgage. It is said that the suit has been brought for the purpose of securing all legal rights of the trust company and that it will not necessarily be brought to a conclusion.

**Successor Company at Mauch Chunk.** —The Mauch Chunk & Lehighton Transit Company, Mauch Chunk, Pa., has been organized as the successor to the Carbon Transit Company and its securities have been approved by the Public Service Commission. The equity above the first mortgage, a bond issue of $100,000 of the Carbon Transit Company, was purchased principally by a majority of the former shareholders and the second mortgage bondholders at receiver's sale on Feb. 15. The new company has $150,000 of common stock, all issued; $50,000 of preferred stock authorized and $37,500 issued; $150,000 of 6 per cent forty-year bonds authorized and $100,000 issued and $150,000 of Carbon Transit Company first lien 5 per cent bonds, all issued, making the total capital liabilities $437,500. The officers of the company are: Ben Branch, president; William Dods, vice-president; Dr. George H. Mayer, treasurer; V. M. Wolff, secretary; C. A. Secor, comptroller; Granville Rehrig, superintendent, and Dennis Duga, assistant to the superintendent.

**Hearing on B. R. T. Application.**— Lewis Nixon, Public Service Commissioner for the First District of New York, held a hearing on June 19, on the application of Lindley M. Garrison as receiver of the Brooklyn Rapid Transit Company, the New York Municipal Railway Corporation and the New York Consolidated Railroad for authority to issue and sell immediately $15,000,000 in receiver's certificates. This application is made under the recent order of Federal Judge Mayer permitting the issuance of $16,000,000 in such certificates, of which $15,000,000 might be issued immediately. Transit Construction Commissioner John H. Delaney sat with Commissioner Nixon, as the former, in whom the rapid transit duties formerly exercised by the Public Service Commission for the First District has an interest in the financial arrangements and expenditures of the three companies named. A considerable part of the money obtained by the sale of receiver's certificates will be expended in construction and equipment of portions of the dual system of rapid transit.

**St. Louis Receiver Reports.**—Rolla Wells, receiver of the United Railways, St. Louis, Mo., during the week ended June 14 filed with the Federal District Court his first report of receipts and disbursements covering the period from April 12, when he took charge, to April 30. The report shows receipts of $1,378,362 and disbursements of $300,467 during this period. The latter item includes only wage expenditures and $14,496 paid for operating indebtedness incurred prior to the receivership. Judge Dyer has authorized the payment of $750,725 interest on bonds of the United Railways. Of this $667,560 is to be paid on July 1 and the balance on Aug. 1. Charles W. Bates, attorney for Receiver Wells in the United Railways receivership, filed an inventory of the assets of the company and imediately withdrew it to have the matter bound. The work of fixing the values of the various properties of the company, ordered by Judge Dyer, still is under way. The inventory as filed contains a description of the properties, but makes valuations only in certain cases.

# Electric Railway Monthly Earnings

ATLANTIC SHORE RAILWAY, SANFORD, ME.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., May, '19 | $11,305 | $14,260 | †$2,955 | $508 | †$3,463 |
| 1m., May, '18 | 17,225 | 10,572 | 6,653 | 475 | 6,178 |

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $148,997 | *$111,941 | $37,056 | $21,317 | $15,739 |
| 1m., Apr., '18 | 145,620 | *107,066 | 38,554 | 30,996 | 7,558 |
| 12m., Apr., '19 | 1,857,935 | *1,455,911 | 402,024 | 267,195 | 134,829 |
| 12m., Apr., '18 | 1,503,319 | *1,279,649 | 223,670 | 364,362 | †140,692 |

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $203,517 | *$150,858 | $52,659 | $56,164 | †$3,505 |
| 1m., Apr., '18 | 246,126 | *169,013 | 77,113 | 71,158 | 5,955 |
| 12m., Apr., '19 | 3,114,017 | *2,159,120 | 954,897 | 798,441 | 156,456 |
| 12m., Apr., '18 | 3,090,145 | *2,150,267 | 939,878 | 841,377 | 98,501 |

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $2,007,033 | *$1,259,433 | $747,600 | $537,564 | $210,036 |
| 1m., Apr., '18 | 1,721,352 | *1,122,208 | 599,144 | 494,273 | 104,871 |
| 12m., Apr., '19 | 23,386,932 | *15,430,562 | 7,956,370 | 6,253,856 | 1,702,514 |
| 12m., Apr., '18 | 20,311,495 | *13,326,305 | 6,985,190 | 5,504,730 | 1,480,460 |

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $82,390 | *$55,017 | $27,373 | $20,730 | $6,643 |
| 1m., Apr., '18 | 74,840 | *44,032 | 30,808 | 19,557 | 11,251 |
| 12m., Apr., '19 | 957,407 | *628,273 | 329,134 | 242,213 | 86,921 |
| 12m., Apr., '18 | 897,032 | *530,058 | 366,974 | 232,075 | 134,899 |

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $332,311 | *$288,019 | $44,292 | $69,748 | †$25,456 |
| 1m., Apr., '18 | 321,032 | *245,482 | 75,550 | 67,686 | 7,864 |
| 12m., Apr., '19 | 4,362,780 | *3,447,611 | 915,169 | 824,197 | 90,972 |
| 12m., Apr., '18 | 3,806,380 | *2,728,789 | 1,077,591 | 795,086 | 282,505 |

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $264,051 | *$196,060 | $67,991 | $39,655 | $28,336 |
| 1m., Apr., '18 | 218,862 | *134,603 | 84,259 | 40,490 | 43,769 |
| 12m., Apr., '19 | 3,081,964 | *2,154,543 | 927,421 | 477,878 | 449,543 |
| 12m., Apr., '18 | 2,488,835 | *1,604,642 | 884,193 | 489,375 | 394,818 |

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $706,244 | *§$423,930 | $282,314 | $192,280 | $90,034 |
| 1m., Apr., '18 | 616,280 | *§366,427 | 249,853 | 178,385 | 71,468 |
| 12m., Apr., '19 | 8,095,204 | *§5,426,797 | 2,668,407 | 2,254,400 | 414,007 |
| 12m., Apr., '18 | 6,530,330 | *§3,961,029 | 2,569,301 | 2,134,071 | 435,230 |

* Includes taxes. † Deficit. § In April, 1919, $21,026; April, 1918, $18,518; twelve months, 1919, $551,870; twelve months, 1918, $252,848, included for depreciation

# Traffic and Transportation

## Mobile Withdraws Appeal

### Company There Decides Upon a Policy of Watchful Waiting Rather Than Commit Itself to Improvements

The Mobile Light & Railroad Company, Mobile, Ala., has withdrawn its appeal to the Council for a 6-cent fare. The reasons are best explained in the company's statement, which follows:

> We hereby ask for the withdrawal of our petition for an increased fare.
>
> While our petition asked for a 6-cent fare in the city division, no increase in school tickets, and no increase in the county divisions, the president of our company informed the members of the City Commission that we would accept a rate on ickets less than 6 cents, therefore, we cannot expect at this time a straight 6-cent are.
>
> After considerable investigating and the making of conservative estimates on the increase in gross revenue from an increase in rates to the slight extent provided for under he ticket proposition, we have come to he conclusion that the increase in revenue would not justify us in putting into pracice a rate schedule that would be difficult o handle and under which we would be expected to spend a large amount of money for track extensions, carhouses, cars and power-house machinery, and the inability to omplete these improvements under a year with the possibility that by the time they were completed there would be no real need for them.
>
> Improvements needed would cost at present more than $300,000, about $125,000 above what we believe would be the ost of this work a year from now.
>
> The statement submitted to you for six months from Oct. 1, 1918, to April 1, 1919, was for a period when the shipbuilding lants were extremely active. This statement showed a deficit from operating of 7,136. A careful estimate for one year rom the date of any grant allowing an increased fare on a ticket proposition figured n the basis of the six months' statement or an unusually heavy period of transportation would increase the gross revenue f our company less than $40,000 for one ear, or after deducting the deficit for one ear, on the basis of the deficit shown for ix months, would leave only about $25,000 et income for a year, or only one-fifth of he excess cost above normal of the improvements mentioned.
>
> We prefer rather than run the risk of nancial embarrassment by adding such a arge amount to our investment which may ot be needed eighteen months from now, o continue the present schedule of rates nd wait and see what the future has in ore as regards the volume of our business and the cost of power-house machinery, cars, tracks and the cost of building dditional carhouses.
>
> We appreciate the almost universal opinion of the citizens of Mobile that we were ntitled to an increase in fare. We further appreciate the fact that the transportaion stem of any growing city has to be prosperous in order to help the prosperity of e city, and we do not feel like risking e investment of our stockholders by contracting for improvements that we might t be able to pay for, when the stockholders are not at this time receiving any return on their investment. We will do the st we can with our present plant and uipment but cannot extend the same under present conditions.

## State Supreme Court Upholds Commission

The Supreme Court of Wisconsin on ay 27 handed down a decision upholding the order of Aug. 23, 1912, ade by the Railroad Commission of Wisconsin, requiring the sale of thirteen city fare tickets for 50 cents. Coupons issued in lieu of the extra tickets ordered by the commission while the case was on appeal must now be redeemed by the company. S. B. Way, vice-president of the company, is quoted as follows:

> The company will not attempt further appeal and will promptly redeem coupons, if presented at its office at 4 cents each in cash. The company interprets the decision as requiring it to refund to holders of coupons the value of a ride when purchased in lots of thirteen or twenty-six during the period while the commission's order of Aug. 23, 1912, was in effect in respect to commutation ticket rates.

## Wants Ferry-Railway Transfers Stopped

Staten Island residents are hopeful of obtaining a modification of Federal Judge Julius M. Mayer's ruling which abolishes the transfer privileges on a 5-cent fare between the Staten Island municipal ferries and the Manhattan surface lines.

The court's decision to curtail the present 5-cent fare arrangement was announced after a hearing on a petition filed by Henry L. Stimson, counsel for Job E. Hedges, receiver of the New York Railways. It was contended by the company that under the present high cost of transportation the railway could no longer operate under the terms of the contract with the city and make a profit.

Judge Mayer announced, however, that he would consider a proposal from Corporation Counsel William P. Burr on behalf of the city to pay the traction company an increased share on each 5-cent fare This proposal is to be submitted during the week of Aug. 18. It provides that the city allot 0.0375 cent on each fare to the railway instead of 0.03644 cent as heretofore. With this it is expected that Staten Island residents will urge the retention of the 5-cent fare with a transfer at least during the week days to protect the commuters.

### TRANSFER SYSTEM IN USE SINCE 1914

The system of transfers has been in operation between the municipal ferry running from the Battery to Staten Island and certain surface lines, since Sept. 9, 1914. Under the agreement of the New York Railway and the city, out of the 5-cent fare paid by a passenger using both car and ferry the railway received 3 cents and the ferry 2 cents.

After the expiration of the first six months the agreement provided that the system may be terminated by either party to it at the end of any calendar year six months from the date of its commencement by giving to the other party three months' notice of its intention to do so.

## Six Cents in Memphis

### After Many Vicissitudes, the Memphis Street Railway Is Allowed Increase by New Commission

It was announced on June 13 that beginning on June 16 the Memphis (Tenn.) Street Railway would charge a 6-cent fare. Both the company and the public appeared to be pleased at the change, although the 7-cent fare was strongly opposed. Residents of Memphis have come to look upon the fare matter from the standpoint of more tracks, more cars, and more interurban service being what Memphis needs to become a metropolis. As one resident put the matter, "the Memphis public are not sticklers over pennies, but they want first-class cars and frequent schedules and the congregation seated in whole rather than some having to stand on their heads or be suspended from crutches." Thus general approval is being expressed of the decision of the new State utilities commission, under whose ruling of June 12 the company will probably be enabled to overtake in part the burden of increasing costs. The order follows:

> IT IS ORDERED, That the receivers of the Memphis Street Railway, during the time it shall remain in the hands of the receivers, and the Memphis Street Railway, after the receivership shall have terminated, be and
>
> THEY ARE HEREBY AUTHORIZED, To establish on June 16, 1919, upon notice to this commission, and to the Memphis public, by one day's filing and posting in the manner prescribed in the rules and regulations of the commission, and thereafter until otherwise ordered by this commission, to maintain and apply to the transportation of passengers over its lines, a rate of fare, not to exceed 6 cents per person, where 5 cents or less is now charged, as an emergency rate. The tariff schedules for said railway shall show in plain terms that said 6-cent rate of fare is an emergency rate.
>
> IT IS FURTHER ORDERED, That an examination be made into the amount or amounts invested in the property of the Memphis Street Railway, upon which it, or its receivers, are entitled to a reasonable return, and that said examination be made by experts, one to be appointed by this commission, and one by the receivers, who shall be paid by the receivers or the company, and that the municipal authorities of the city of Memphis shall have the right, if they see proper to exercise it, of appointing an expert at their own expense, to act with the experts appointed by this commission and the railway, or its receivers, and that reports shall be filed with the commission by the experts, within four months from July 1, 1919, the reasonable cost of such examination and reports shall be paid by the receivers or the company. The reports of said experts may be joint or several, as determined by them, and upon filing of said reports, the right is reserved to the parties to the record in this case, to make application for such other and further relief as to them may appear to be reasonable and equitable.

## Council Approves Fare Advance

The Public Utilities Commission of Colorado has granted permission to the Colorado Springs & Interurban Railway to file a tariff increasing the fare in Colorado Springs from 5 cents to 6 cents. The increase becomes effective on June 8. The action of the commission follows receipt of a resolution passed by the City Council of Colorado Springs requesting the commission to permit the railway to advance fares.

# W. H. Taft Advocates Higher Fares

## Increased Costs of Maintenance and Operation and Advanced Wages of Platform Men Practical Facts to Be Faced

A brief notice was published in last week's issue of an editorial article in the Philadelphia *Public Ledger* for June 12, by Ex-President William H. Taft, on the necessity for higher fares on city railways. The full text of this article, which is copyrighted, 1919, by the Public Ledger Company, follows:

The financial situation of the general steam railroad system of the country is bad enough, but it is far better than that of the electric street and suburban railway systems. There are several reasons for this, the last and perhaps the most influential of which has grown out of the war.

### SOME MISTAKES MADE

In the first place many electric lines were built through territory which did not and could not furnish traffic enough to pay the expenses of operation at the time of construction, and they have never paid since. Many were built to develop the settlement of subdivisions, in the exploitation and sale of which directors and others were interested. Common councils and other municipal bodies also pressed for their construction, and they were undertaken without careful business foresight. An important element now interfering with the business in both city and suburban lines is the use of the automobile. The jitney business, which for a time threatened destruction to the street railways, has not survived; but the normal use of automobiles has increased so much as to constitute a serious reduction in railway receipts.

On city railways the fare has generally been 5 cents for all distances, the theory being that the volume of the business would reduce the cost per head of passenger in such a way as to make the fixed single fare profitable. Indeed, in some cities 3 and 4-cent fares have been forced. The public has thus been trained to regard anything more than 5 cents as an infringement upon its rights and privileges and an unjust swelling of the profits of traction capitalists. This feeling has been intensified among the people by the knowledge of the use of sinister and corrupt methods in originally securing franchises. The result is that in every community, however honest and earnest the present owners may be, they have an inheritance of popular distrust and hostility that works greatly to their detriment when they ask for justice at the hands of the public.

### FIVE CENTS NOT REASONABLE COMPENSATION

Five cents under present conditions is generally not reasonable compensation for the service rendered in any city. The great percentage of increase in the cost of every material that enters into maintenance and operation requires, as a mere matter of fairness and equity, that the fares be increased. Coal, wire, rails, oil and cars have gone up with the price of other commodities in the community. Indeed, this condition was coming on before the war. One important element of the cost of operation has long been kept down simply through the necessitous circumstances of the street railways. That was the cost of labor. With their backs to the wall, the street railway managers refused to advance wages as wages advanced in other fields of labor. The platform men of street railways perform a semi-skilled service, the value of experience in which the companies themselves recognize by wages graded according to years of training. In order that the men should live upon the wages granted them at all, they have generally had to work from ten to twelve hours a day, seven days in the week. The unequal demand for service through the hours of the day and the "peaks" between 6 and 9 in the morning and 4 and 7 in the afternoon prevented runs of continuous hours for many of the men and required intervals in their periods of service, so that between the time of the beginning and the end of the daily runs of many fourteen to seventeen hours elapsed. This time was technically known among street railway men as the "spread."

### WHY LABOR BOARD ADVANCED WAGES

When the war came on, the issue of wages on street railways came within the jurisdiction of the National War Labor Board, because the service of street railways all over the country was necessary to maintain maximum production in the factories where war supplies were made. Without street railway labor could not reach the places where it was employed. The National War Labor Board was asked to fix the wages of street-car men in many cities. Generally the street railway companies, obeying the patriotic impulse, submitted to the arbitration of the board. The slightest examination of the wages paid and the hours employed developed the fact that street-railway labor had been underpaid and that the hours were generally too long.

It was objected that the increase in wages and the reduction of hours would prevent companies from operating at a profit and might lead to bankruptcy. The attitude of the board, or of the two joint chairmen who usually sat as arbitrators, was that the question of wages in an arbitration like this was not one which could be affected by the question of profit of operation; that it was like fixing the price of coal or of any other element that entered into the cost of operation; that it must be governed by the range of wages for similar services in the same community and by minimum limitation as to the cost of living. The result was that the maximum wages were advanced in most cases from about 33 or 34 cents an hour to 48 cents an hour in the case of large cities, with variation down to 40 cents an hour in cities where the cost of living was less.

### A MEASURE OF RECOGNITION

This increase, of course, added materially to the necessary expenditures of the railway company and the burden of the cost of operation; but it was only one of many elements which cut down dividends and interfered with the payment of the fixed charges on bonds and other securities. The National War Labor Board did not hesitate to recommend in every case an increase of the fares as only just to the owners of the street railway companies. A number of utility commissions of the various states responded to the recommendation and increased the fares. This action was noteworthy in Massachusetts and in Boston.

But often the statutes were in such form that state commissions had no jurisdiction to make the increase. The rates were fixed in a municipal franchise and could only be varied by the action of the common council or by a referendum to the people, and such referendums always resulted in a popular vote against the increase of fares beyond 5 cents.

Another difficulty was that too great increases in fares reduced the number of persons carried and left conditions as bad as before. The result for the companies was the grinding of them between the upper and the nether millstones, and that grinding is going on to-day, with the inevitable result of bringing the street railway companies and the suburban lines into receiverships and bankruptcy and a permanent injury and loss to a most useful and indispensable public agency of intercommunication.

Joseph K. Choate, in New York, representing a number of electric railways of that State, has asked the State authorities to recommend legislation looking to a relief of this situation. The capital invested in that State, he says, is more than $1,250,000,000. It is to be hoped that Mr. Choate's petition on behalf of his clients will be granted, that the whole subject may have the most thorough investigation and that action be taken by the State Legislature, which has the power to ignore franchises and other limitations now in the local laws and to do justice to the companies under existing conditions.

### MUNICIPAL OWNERSHIP NOT A SOLUTION

There are those who believe that the situation can only be relieved by municipal ownership. This seems to many and to the writer to be a short-sighted conclusion. Such a change of ownership will not reduce the cost of operation. Instead, our experience is that it will greatly increase it if ownership is to include municipal operation. The intervention of politics always increases the cost of operation and leads to unwise business management. Many who favor municipal operation admit that the present system cannot be continued by municipal and state governments without a constant loss. They propose that the losses be made up by taxation. The theory is that, as the community is taxed to build roads and bridges and other means of communication, the same principle might easily be extended to actual transportation. But our experience in public control of that kind of active and complicated business management has not been fortunate. It foreshadows such lack of economy and increase in cost of operation as to make the change most unwise. It is far better that we should pay as we go. It is far better that we should measure the cost by a system of service at cost, with close public supervision and an increase of fare as the actual operations demand it, and with a small reasonable compensation for the use of capital, than that we should turn over to political control the conduct of such business enterprises, which need the best talent for their economical management.

But whatever the remedy to be undertaken, the condition of investments now reaching at least five billions in the country is so serious that public attention should be aroused to the necessity of devising ways and means to meet the crisis.

## New York Fares Up Again

### Mayor Unmoved by Receiverships, but First District Commissioner in Mood for Mutual Concessions

Both Mayor Hylan of New York and Public Service Commissioner Nixon have made statements recently in regard to the fare situation in New York City. The Mayor discussed the matter because of gossip to the effect that if the Board of Estimate of New York City refused to authorize an increase in fare the next Legislature would be asked to take the matter out of the hands of the city administration. The Mayor promised to do what he could to have elected to the Legislature only men who would oppose a higher fare. The Mayor's statement read:

> I will oppose an increased fare and if the transit corporations refuse to operate the lines the city will operate them in the interest of the people. It was stated in the press that if the Board of Estimate would not consent to an increased fare an appeal would be made to the Legislature of 1920 for a law which would take the power out of the hands of the city administration.
>
> I want to say now that the people should ask the designees of both parties of every Senatorial and Assembly district before primary day in September if they are for or against an increased fare to the transit corporations of the city, and if they refuse to take a stand against an increased fare they should be opposed in the primary and on election day regardless of party affiliations.
>
> I will take an active part in any Senatorial or Assembly district campaign to help defeat any candidate who refuses to take a stand against increased fares.

Mr. Nixon discussed the fare question for the purpose of correcting erroneous ideas growing out of his recent speech before the Brooklyn Chamber of Commerce. Mr. Nixon explained that many versions had been given to what he said in his Brooklyn speech, but that what he intended to say was that he thought further electric railway receiverships would be bad for the city, state and nation, and that every effort should be made to avoid them. If he had been vested with power to adjust fares to meet the situation, he would have acted by now. It was his idea that in any adjustment made there should be give and take from both sides. No adjustment could be one-sided. He said he desired to make clear the fact that nothing would be done by him under any circumstances except in co-operation with the Mayor.

Mr. Nixon explained that any amendment to the rapid transit contracts would be a matter for the attention of the rapid transit commissioner and that he would be interested only so far as the service and management were concerned. Mr. Nixon said that when the equipment and service were affected because of lack of funds it became his duty to present his views. From this viewpoint he discussed the fare question and the leases under the dual system and what might be considered as desirable changes in the rapid transit contracts. He is quoted as follows:

> The amendment of the rapid transit contracts is a matter for the Transit Construction Commissioner and the Board of Estimate to determine. If the demand for a higher fare were simply a question of operating costs the whole matter could be determined at once, as the increase in such costs is known to all. Much light has been thrown upon the other elements entering into the matter by existing receiverships. It has been pointed out that underlying leases and mortgages carried with them influences that might be most harmful in the future. Already we find certain of these properties demanding separation.
>
> But the companies ask that their deficiencies be made up by higher fares. Whether the city should pay the carrying charges on its investments out of taxes or increased fares is a matter of municipal policy. If, however, a permanent and equitable settlement of the present situation in all of its phases can be secured through an increase in fares and concessions in return on the part of the companies, there exists a compelling reason for such increase.
>
> There must, however, as the matter presents itself to me, be a readjustment of present conditions and an advance in the position which the city's investment takes under the dual contracts in the distribution of earnings.
>
> If the right to raise fares to meet an emergency exists, which right can only now be exercised by the city, it should in turn be assured of the right to reduce them when earnings advance.
>
> With such a situation clearly met it would seem that investments made in traction properties will have an assurance of certain return, and the interest paid should be on the basis which safe and guaranteed investments merit.
>
> If on account of permanent or long-term franchises certain provisions were forced into the dual subway contracts such provisions must be modified in the interest of the city in a fair adjustment.
>
> We cannot see the great system of transportation now so vital to our growing population jeopardized through physical deterioration, and while within two years the present fares may pay, a present need is facing us which cannot be met by drifting without general impairment.

On June 19 it was announced that the Public Service Commission for the Second District had refused the request of J. K. Choate, chairman of the committee on ways and means to obtain additional revenue of the New York electrical railways, for an investigation of the traction situation in New York State, with a view to recommending remedial legislation for the next Legislature.

At the suggestion of Governor Smith, to whom application for the appointment of a commission to investigate the situation had been made, Mr. Choate wrote to Chairman Charles B. Hill of the Second District Commission on June 3, calling attention to Governor Smith's suggestion and making a formal request for an investigation. Under date of June 6, Chairman Hill replied in part as follows:

> I observe that Governor Smith very naturally suggested that inasmuch as the State now has two public service commissions whose duty it is to investigate and to propose remedial measures connected with the subject matter it would seem that these commissions should be able to present suggestions on the subject, and that you present your claims to them and ask that they give the same consideration.
>
> I am greatly surprised, however, that you entirely ignore the fact that this commission anticipated both your suggestion and that of the Governor in the most comprehensive, explicit and public way, without urging by the electric railway interests, in its official report to the last Legislature. That report and its recommendation received very wide publicity in the press and very direct attention from the members of the Legislature. It was followed by the introduction of a bill designed to enlarge the powers of the commission in the respects recommended by the commission, and this bill also received great publicity and was much discussed both in the press and in the Legislature, and was the subject of a special joint session of the legislative committee held in the Assembly Chamber, at which former Governor Hughes appeared and spoke. This was probably the most largely attended hearing before any of the legislative committees.
>
> I am sending you under separate cover, a copy of the commission's annual report to which I have referred, with those portions marked which bear directly upon the question.
>
> As pointed out, this commission has anticipated your suggestion by one full legislative year. If a further hearing would produce additional facts on which to base suggestions for any different or further remedial legislation the commission will, as suggested in the Governor's letter, conduct such a hearing on the petition of any interested party.
>
> Regarding your suggestion of joint action by the two commissions, we feel that, in view of the great difference in character of the railroads in the two districts, the commission in the first district would probably much prefer to act upon its own initiative.

Immediately upon receipt of this communication, Mr. Choate sent a letter to Chairman Hill in part as follows:

> The committee of which I am the chairman was, of course, fully cognizant of the very valuable constructive work done by your commission in the matter of legislation. All of its members felt that your commission was fully alive to its duty in the matter, and had your suggestions been carried out, there would, of course, have been no occasion for further action in the premises.
>
> However, the Legislature adjourned without passing any remedial legislation, and the situation was left as it had been, except that the condition of the companies was, by the cumulative effect of the burdens they are bearing, in worse shape than ever before.

The committee believes that unless something is done the State is threatened with a practical destruction of its system of electric railways.

It was for that reason that it made its first suggestion to Governor Smith. It was for that reason, too, that it very gladly accepted Governor Smith's suggestion that such investigation could well be made by the commissions. The committee believes that the publicity which is necessary in order to create a public opinion that will result in the enactment of legislation, could, to a very large extent be secured if the two Public Service Commissions hold public meetings and the true picture of the industry's plight is thus presented.

The committee believes, however, that the work can be done much more effectively if it could be undertaken by the commissions on their own initiative, rather than on formal application for a hearing coming from either the committee or any particular company.

It agrees with you that the problems of the Second District are in a measure distinct, and it was for that reason that it suggested that the investigations be conducted separately. However, it is of the opinion that the remedy is in both cases very much the same, and that the solution which the commissions might arrive at separately, would be the same.

I still hope that your commission will be able to see its way clear to conduct such an investigation.

Under date of June 13, Chairman Hill, in reply, communicated to Mr. Choate, the decision of the commission not to hold the investigation.

Mr. Choate expressed himself as very much disappointed over the outcome.

## Mr. Taft Warns Denver Mayor

Chairman Taft of the National War Labor Board wired the Mayor of Denver from New York on June 14 as follows:

> Consider it is unjust and a breach of faith to pass the ordinance reducing the fare on the Denver street railway from 6 cents to 5 cents. A careful examination of the condition of the railway and its finances demonstrates that even with a 6-cent fare no dividends and no allowance for depreciation can be provided for, for the reduction to 5 cents will throw the company into bankruptcy. This is certain to introduce a wage discussion and will reflect on the fairness and honor of the city.

The telegram of Mr. Taft had its origin in connection with a letter of Frederic W. Hild, general manager of the Denver Tramway, in which city officials were asked to allow the 6-cent fare to continue as provided for in the ordinance passed by a former administration. In reply to this letter from Mr. Hild, Mayor Dewey C. Bailey on June 5 pointed out that a fare greater than 5 cents will not be considered during his administration.

Coincident with the reply letter, which was made public, came the statement from the Mayor that the proposed ordinance for the restoration of the fare to 5 cents would be introduced in the Council on June 9.

Mr. Hild wrote to the Mayor and asked him to refrain from reducing the fare to 5 cents at this time, declaring that such action would mean the "utter ruin and bankruptcy" of the company. The ordinance for a 6-cent fare, unless repealed, will remain in effect until twenty-one months after peace has been consummated.

The Mayor has based his reply on the provisions entered into between the tramway company and the city in its franchise.

## Ten-Cent Fares Expected at Boston

It is understood that the trustees of the Boston (Mass.) Elevated Railway have practically decided to start a 10-cent fare on July 1. A decision will be announced on June 25, with a public statement reviewing the conditions and giving the reasons for the increase. The failure of the bill for the purchase of the Cambridge subway by the State and the fact that the cost of service is more than 9 cents per passenger appear to leave the trustees no other choice but to establish a fare in excess of the existing 8-cent rate.

# Transportation News Notes

**Village Refuses Increase in Interurban Fare.**—The Village Council at Fairport, Ohio, has refused to approve an increase in the rate of fare between Painesville and Fairport, as requested by the Cleveland, Painesville & Eastern Railway. The rate has been 15 cents a round trip. The railway company asked that it be raised to 10 cents each way.

**Returns to Five Cents Temporarily.**—Benjamin S. Hanchett, president of the Grand Rapids (Mich.) Railway, voluntarily consented on June 13 to charge a 5-cent fare during July. The reduction of the fare is for a test only, and if the report of the company at the end of the month shows that it cannot continue operation and "break even" with less than a 6-cent fare, the City Commission promised its support.

**Bankers Urge Fare Action.**—New York bankers in the closing session of the twenty-ninth annual convention on June 13 adopted resolutions favoring the early return of the railroads to private control, with compensation from federal funds to place the properties in normal physical condition. Communities or cities were urged in another resolution to amend present laws and regulations to enable electric railways to increase fares.

**Traffic Ordinance Revised.**—The traffic ordinance prepared by the Corporation Counsel of Seattle, Wash., regulating traffic on the streets of Seattle was sent back to the Corporation Counsel for redrafting, after a three-hour discussion in which representatives of various automobile associations, team and truck owners' associations, municipal railway and corporation counsel's office participated. The revised ordinance is to be somewhat less drastic, and to provide certain parking privileges for automobiles on downtown streets.

**May Have to Increase Cleveland Fare.**—Should the advance in wages be allowed to the employees of the Cleveland (Ohio) Railway which is referred to elsewhere in this issue, the rate of fare may have to be advanced to 6 cents. Recently it was announced that the rate would be slightly reduced on July 1. At that time, there was no indication that employees would ask for an increase, since they are now working under an award of the Federal War Labor Board and it was supposed that they would continue at present wages until the expiration of their contract next May.

**Another Kentucky Hearing.**—Another hearing was set for Louisville, Ky., on June 20, in connection with the controversy between the Louisville & Interurban Railway and the Suburban Protective Association, representing the suburban passengers. The case is being carried on before the Kentucky State Railroad Commission. The legal advisors of the railway contend that recent holdings of the commission in reducing fares are illegal, as the commission exceeded its authority, in arranging a general schedule, instead of taking up singly complaints of rates on certain lines, from specified stations.

**Chicago Fares Inadequate.**—The increase of 1 cent in fare granted to the Chicago (Ill.) Elevated Railways last November by the Public Utilities Commission has proved altogether inadequate to meet the increased cost of operation, and the company is hoping for favorable action on its petition for a 7-cent fare. The report for the first three months of operation at 6 cents shows an increase in revenues of $248,849, while the operating expenses increased $588,351 over the same period of the previous year. Meanwhile the Chicago Surface Lines are operating at a 5-cent fare, and while increased traffic has helped to a certain extent this will not meet the cost of service. The company is waiting for a hearing in the courts on its appeal from the commission ruling which refused an advance in rates.

**Eight-Cent Fare in Peekskill.**—The Public Service Commission for the Second District of New York has granted permission to the Putnam & Westchester Traction Company to charge an 8-cent fare in Peekskill and 2 cents for a transfer in Peekskill to the Peekskill Lighting & Railroad Company. The new rates of fare to be established under the schedule to be filed may also provide an 8-cent fare outside Peekskill affecting zones 1 and 2. The order is to remain in effect for five years from May 24, 1919, unless the commission determines on investigation that conditions have so changed as to warrant a reduction or change in the fares. There was no opposition to the company's petition at the hearing and the commission approved the action of the Peekskill authorities in amending the company's franchise. The new tariff becomes effective on one day's notice.

# Personal Mention

**H. J. Van Buren** has been appointed chief electrician of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., succeeding G. W. Twyford.

**George M. Evans** has been appointed chief electrical engineer of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., succeeding F. H. Gregg.

**Keith Randolph** has been appointed general freight and claim agent of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., to succeed H. J. Enders.

**Frank Wendle** has been appointed assistant superintendent of transportation of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., succeeding C. L. Osborne.

**H. E. Chubbuck,** vice-president executive of the Illinois Traction System, Peoria, Ill., has been elected a trustee of the Bradley Polytechnic Institute, Peoria, to succeed the late Judge Leslie D. Puterbaugh.

**F. Arthur Harrington,** connected with the claim department of the Bay State Street Railway at Lowell, Mass., has been promoted to the office of assistant claim agent of the Quincy division of the company.

**Martin Schreiber,** chief engineer of the Public Service Corporation of New Jersey, Newark, N. J., has been elected a member of the committee on electrolysis, representing the American Railway Engineering Association.

**Richard E. Lyman,** Providence, R. I., who has been appointed master in chancery to untangle the affairs of the Rhode Island Company, is an attorney of prominence. When the Central Trust Company, Providence, failed a number of years ago, Mr. Lyman was made receiver. He is well known in Rhode Island and quite conversant with the financial difficulties the Rhode Island Company has encountered.

**E. Burt Fenton,** for the last two years publicity agent of the Northern Ohio Traction & Light Company, Akron, Ohio, has resigned that position. He was formerly publicity manager of the W. S. Barstow & Company properties, and for some years past has specialized on matters pertaining to the public relations of utilities. Mr. Fenton is the author of several papers and magazine articles on this subject which have attracted wide attention and received favorable comment. He has not announced his plans for the future.

**Godfrey Goldmark,** who became chief counsel of the Public Service Commission for the First District of New York on Jan. 1, has sent his resignation to Commissioner Lewis Nixon with the request that it be accepted at once. At Mr. Nixon's request, Mr. Goldmark will continue until July 1. Mr. Goldmark's first service with the commission was as secretary to Oscar S. Straus, former chairman of the commission. He then became assistant chief counsel, and later succeeded William L. Ransom. Mr. Goldmark is to become the junior member of a new law firm of which Col. William Hayward and Maj. Holley Clark are the other members.

**Hudson R. Biery,** recently appointed purchasing agent of the Union Traction Company of Indiana, Indianapolis, Ind., was born and reared in Scottsburg, Scott County, Indiana. He worked for the Indianapolis & Louisville Traction Railway in 1906 during the construction of that road. In 1908 he became storekeeper for the company and in 1909 was made clerk to the superintendent of that property. The reorganization of the company in 1911 resulted in the reduction of the force and the consolidation of the duties of traffic manager and purchasing agent with those of superintendent under the title of assistant to the general manager and to this position Mr. Biery was promoted.

**Lieut.-Col. Henry M. Byllesby,** president of H. M. Byllesby & Company, Chicago, Ill., who served as purchasing agent for Great Britain and Scandinavian countries with the American Expeditionary Forces, headquarters in London, has just been advised that the English Distinguished Service Order has been conferred upon him. The minister of munitions of the British government, in advising Colonel Byllesby, writes as follows: "I have just learned with great satisfaction that the King has approved of the award to you of the Distinguished Service Order, a much coveted distinction, of which any officer may be proud. From the moment of your arrival in Great Britain you made it quite clear that you were determined to carry on and largely extend the assistance rendered to my department by your organization, and throughout the whole period of our cooperation with you our personal relations have been of the most cordial character. Please accept my warm congratulations on this well-deserved recognition of the great work you have done."

**Cornelius S. Sweetland,** Providence, R. I., who, as noted elsewhere in this issue, has been appointed by Presiding Justice Tanner of the Superior Court temporary receiver of the United Traction & Electric Company, Providence, has had exceptional experience in receiverships in the past. He was born on July 15, 1845, and after attending the public schools of the State, was graduated from Brown University in the class of 1866. He entered the banking business and was later made president of the Jackson Bank, which has since gone out of existence. He was receiver of the Inter State Street Railway, Attleboro, Mass., and when the holdings of the Union Railroad, Providence, were consolidated with other electric railway properties in the State and the United Traction & Electric Company formed, Mr. Sweetland was made treasurer. He was vice-president of the Union Trust Company, Providence, and when that bank closed its doors during the 1907 panic he was appointed one of the receivers. In 1889 Mr. Sweetland succeeded Zachariah Chaffee as trustee of all the property represented in the failure of A. & W. Sprague Manufacturing Company, one of the largest cotton mill properties in New England, the failure of which in 1873 startled the country. Mr. Sweetland's private business activity is represented in his holding a vice-presidency in the Rumford Chemical Works and as a trustee of the Alfred Anthony Land Company, both of Providence. In 1892 he was made a trustee of Brown University and eight years later was appointed treasurer, which position he holds at present.

# Obituary

**Paul M. Einert,** for twenty years foreign supervising auditor of the Westinghouse Electric & Manufacturing Company and since last January special assistant to Guy E. Tripp. chairman of the board of directors of the Westinghouse Company, is dead.

**J. T. Hury,** traffic manager for the Birmingham Railway, Light & Power Company, Birmingham, Ala., died on June 3 at Asheville, N. C., after a protracted illness. The funeral was held from his residence in Birmingham on June 5. Mr. Hury was fifty-two years of age. He had been connected with the Birmingham Railway, Light & Power Company for the last twenty-eight years and for several years past he had been traffic manager.

**Paul Leake,** secretary of the Detroit Stock Exchange, is dead at his home after an illness of two months. Mr. Leake was widely known in financial and newspaper circles in Detroit and Grand Rapids. He was financial editor of the Detroit *Free Press* for a number of years, later going to Grand Rapids where he became publicity manager for the American Public Utilities Company, operating about fifteen public utilities in various parts of the United States. He was born in New York.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Signs of Better Traction Purchasing

### Need for Rehabilitation and Certainty of Higher Prices Apparently Back of Activity

Reports from here and there indicate unmistakably that the tide of electric railway purchasing is on the turn. No large business is looked for but better business is on the way. This business is being placed apparently because the roads are beginning to realize the futility of holding off. Before another winter sets in a whole lot of work must be done to the road, the rolling stock and the overhead system.

Incidentally not a few managers realize that goods can be purchased at lower prices to-day than will prevail in August and September. Paints and oils may go higher, especially leads and zincs. Wire is advancing and, there are reasons for believing, will go at least 10 to 15 per cent higher during the next quarter. Rails can be expected to be higher before they are lower. Some concessions have been reported, but indications are that the steel market will be very tight shortly.

Managers may find it best to lay in coil winding supplies and all metal supplies well ahead of time.

## Line Materials Expected to Go Higher

### Advancing Prices of Copper and Lumber Make it Advisable to Place Orders Now

Prices of distribution and transmission-line material are lower at this writing than they probably will be at any time later in the year. Railways that are contemplating the extension or rehabilitation of lines or the building of new ones would not be making a mistake if they placed their orders for required material prior to July 1.

Wire is advancing steadily. At this writing weather-proof is on a 20-cent to 22-cent base and bare wire on a 19½-cent to 20-cent base.

Copper is being quoted at 17¾ cents for early delivery. In fact, there is every indication now that the copper will go as high, if not higher than, 20 cents a pound during the early fall months.

Wire, in other words, can be expected during the next quarter to advance further from 10 to 15 per cent or more.

Poles and cross-arms are due to advance from 10 to 15 per cent by the first of July, and in some instances cedar poles are advancing this week.

Pole-line hardware is undoubtedly as low as it is going. As soon as steel begins to stiffen in price, and that will probably happen the next thirty to fifty days, hardware may be expected to go higher.

Insulators show no tendency downward. In fact, it would not be surprising if, in view of possible higher transportation and labor charges, the price of insulators advanced before the fall months.

Guy lines, anchors and transmission towers will probably be guided largely by the price of steel. Inasmuch as steel is expected in some quarters to go slightly higher in July or early August, there seems to be no good reason for believing these products will go lower.

Transformers, it is learned on good authority, will go no lower this year. In fact, it is not improbable that costs may mount so rapidly that higher charges must be made.

Lightning arrester prices appear to be very steady. Cement for tower and pole ground work is also very steady.

## No Reduction in Outdoor Switching Equipment

### Prominent Manufacturer Holds that Reductions Will Come Only as a Result of Heavier Buying

In a conversation held by a representative of the ELECTRIC RAILWAY JOURNAL with a prominent manufacturer regarding price trend of outdoor substation and switching equipment, the manufacturer gave it as his opinion that prices could be lowered if production could be stimulated through buying. If his organization was to be kept together, after so much necessary expenditure to bring it to its present development, it was impossible to reduce the overhead. Consequently, with the low production due to curtailed buying in the last two years, the same overhead had to be distributed over a smaller number of units produced, thereby increasing the cost of each unit. If it were desired to let go of the trained organization over the short period of low production, then prices could be adjusted.

"The economic way to reduce the cost of the apparatus is to get back to quantity production," said the manufacturer. "That means that the power companies must get out of the rut of holding until prices lower. Prices will lower through buying, not through holding off. Peace is about to be concluded, the Victory loan is safely by, and Congress is now in session. This should have some stabilizing influence on industry.

## Wire and Cable Sales Picking Up Rapidly

### Indications Now Point to Full Capacity Production of Mills During the Coming Fall Months

Wire and cable manufacturers report a steady increase in orders booked. For a while incoming business was rather slow, particularly in the East. The Middle West and the South have been purchasing more steadily. Last week some very nice cable orders were placed in the East, and the manufacturers are of the opinion that better business is on the way.

Rubber-covered wire demand began to pick up perceptibly about five or six weeks ago and has gathered momentum ever since. Each time the price advanced the buying appeared to go ahead faster.

With advancing copper prices and assurances of 10 to 15 per cent higher prices by the early fall the wire market should rapidly become better. In addition, construction work is getting larger every day.

There is every reason to believe that by September the copper wire mills of the country will again be running at full capacity.

## Transformer Prices Not Expected to Go Lower

### War Increases in Raw Materials Do Not Reflect Prices for Finished Products

In the opinion of those in close touch with the manufacturing of transformers, the bottom has been reached in prices of such equipment. It is pointed out that labor costs show no tendency whatever to decrease. Some material costs are running lower than during the height of the war.

Thus, magnetic steel is now costing the transformer manufacturer about 9 cents per pound, compared with 14 cents in the period of maximum demand and allowing for wastage in the fabrication of lamination sheets of the proper shape. The maximum cost of this steel was practically equivalent to the price of copper the year before the war.

Considerable stocks of copper and steel which were purchased at prices in excess of ruling quotations are yet to be worked up at the factories. The overhead cost in transformer manufacture and the labor cost are to-day probably not far apart. Insulating materials are a little easier in price than last year, but with present high labor and overhead charges, with existing high cost of maintaining sales work in the field and with outputs far below the capacity of the factories, it is held that no reasonable basis for price reduction exists, bearing in mind always that the price advances of transformer equipment during the war did not exceed about 60 per cent compared with from two to five times that advance in many other manufactured commodities. There is no certainty that the prices of steel and copper will not advance materially during the present year, and neither is it positive that no further increases in the cost of labor will be registered.

Little is being heard of guarantees covering price reductions this year in the transformer quotations now being offered. Since the prices of such equipment did not follow the advances in material cost during the war, it results that very substantial drops can take place in raw-material costs before any sympathetic fall in product prices may be expected. Possibly in the future mass production on the basis of greatly increased labor efficiency may allow a moderate recession to be established, but the prospects are that prices now current will form the basis of quotations for a long time hence.

## British Import Restrictions Removed

The War Trade Board announces that copper wire and copper-clad wire may be imported into Great Britain without individual license.

## Pump Manufacturers Combine

The entire pumping machinery business of the Canton-Hughes Pump Company, Wooster, Ohio, has been purchased by the Chalmers Pump & Manufacturing Company, Lima, Ohio, which company is a reorganization of the Chalmers Manufacturing Company, with increased capital and manufacturing facilities necessary for the new business. The officers of the Chalmers Pump & Manufacturing Company are C. S. Brown, president; Frank D. Shumate, vice-president and sales manager; Fred Biszanta, secretary and treasurer. Messrs. Brown and Biszanta, as executives of the Chalmers Manufacturing Company, have been active as founders and builders of machinery.

Mr. Shumate, of Chicago, who has become associated with the new organization, brings to it a broad experience in the engineering and sales field of pumping machinery, gained through his connection with the Worthington Pump & Machinery Corporation for the past thirteen years throughout the Middle West, Southwest, Mexico and Canada. The Canton-Hughes Pump Company has built pumping machinery for many years and has a full line of single and duplex steam and power pumps, air compressors, jet and surface condensers for medium vacuum work, and many pumps for special purposes. The manufacture of the line will be continued actively.

The general offices and works will be at Lima, Ohio, with agents in all of the principal cities.

## Rolling Stock

**Indianapolis Traction & Terminal Company, Indianapolis, Ind.,** has reported to the Public Service Commission of that state that since the order of the commission on Dec. 28 it has converted 150 cars into cars of the prepayment type and that 100 more cars will be changed.

## Franchises

**Cleveland, Ohio.**—The City Council of Cleveland has granted the Cleveland Railway three franchises to construct a single track extension on West Seventy-third Street, from Denison Avenue S. W., to Linndale Road S. W.; double track extension on Broadview Avenue S. W., from Pearl Road S. W. to Tate Avenue S. W., thence to the intersection of Schaaf Road S. W., and a double-track extension in the southeastern part of the city, beginning at Union Avenue S. W., to South View Avenue S. E., via East 116th Street and Corlett Avenue S. E.

## Track and Roadway

**Calgary (Alta.) Municipal Railway.**—The Calgary Municpal Railway plans to construct 1 mile of new track in the city of Calgary, and will use the rails, etc., from the line which was laid to serve the military camp on the Sarcee

## NEW YORK METAL MARKET PRICES

| | June 5 | June 18 |
|---|---|---|
| Copper, ingots, cents per lb | 16.62½ | 17.75 |
| Copper wire base, cents per lb | 18.25 to 18.75 | 20.00 to 20 50 |
| Lead, cents per lb | 5.25 | 5.40 |
| Nickel, cents per lb | 40.00 | 40.00 |
| Spelter, cents per lb | 6.47½ | 6.90 |
| Tin, cents per lb | †72.50 | †72.50 |
| Aluminum, 98 to 99 per cent, cents per lb | 32.00 to 33.00 | 33.00 |

† Government price in 25-ton lots or more f.o.b. plant.

## OLD METAL PRICES—NEW YORK

| | June 5 | June 18 |
|---|---|---|
| Heavy copper, cents per lb | 14 50 to 14 75 | 15 00 to 15 50 |
| Light copper, cents per lb | 11.75 to 12.50 | 12 00 to 12 75 |
| Heavy brass, cents per lb | 8.00 to 8 50 | 8 50 to 9 25 |
| Zinc, cents per lb | 5 00 to 5 50 | 5 25 to 5.50 |
| Yellow brass, cents per lb | 7 25 to 7 75 | 7 50 to 8 00 |
| Lead, heavy, cents per lb | 4 50 to 4 60 | 4 75 to 4 87½ |
| Steel car axles, Chicago, per net ton | $23 00 to $24 00 | $23 00 to $24 00 |
| Old carwheels, Chicago, per gross ton | $21 00 to $22 00 | $21 00 to $22 00 |
| Steel rails (scrap), Chicago, per gross ton | $16 50 to $17 00 | $18 50 to $19 00 |
| Steel rails (relaying), Chicago, gross ton | $16 50 to $17.00 | $19 50 to $20.00 |
| Machine shop turnings, Chicago, net ton | $6.00 to $6.50 | $6 50 to $7 00 |

## ELECTRIC RAILWAY MATERIAL PRICES

| | June 5 | June 18 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb | 21 | 22 |
| Weatherproof wire (100 lb. lots), cents per lb., New York | 23.25 to 24.00 | 26 00 to 23.25 |
| Weatherproof wire (100 lb. lots), cents per lb., Chicago | 24.50 to 24 75 | 25 75 to 26 50 |
| T rails (A. S. C. E. standard), per gross ton | $49 00 to $51 00 | 49.00 to 51.00 |
| T rails (A. S. C. E. standard), 20 to 500 ton lots, per gross ton | $47 00 to $49 00 | 47.00 to 49.00 |
| T rails (A. S. C. E. standard), 500 ton lots, per gross ton | $45 00 to $47 00 | 45.00 to 47.00 |
| T rail, high (Shanghai), cents per lb | 3 | 3 |
| Rails, girder (grooved), cents per lb | 3 | 3 |
| Wire nails, Pittsburgh, cents per lb | 3.25 | 3.25 |
| Railroad spikes, drive, Pittsburgh base, cents per lb | 3 35 | 3.35 |
| Railroad spikes, screw, Pittsburgh base, cents per lb | 8 | 8 |
| Tie plates (flat type), cents per lb | 2.75 | 2.75 |
| Tie plates (brace type), cents per lb | 2.75 | 2.75 |
| Tie rods, Pittsburgh base, cents per lb. | 7 | 7 |
| Fish plates, cents per lb | 3 | 3 |
| Angle plates, cents per lb | 3.90 | 3.90 |
| Angle bars, cents per lb | 3.90 | 3.90 |
| Rail bolts and nuts, Pittsburgh base, cents per lb | 4 35 | 4.35 |
| Steel bars, Pittsburgh, cents per lb | 2 35 | 2.35 |
| Sheet iron, black (24 gage), Pittsburgh, cents per lb | 4 20 | 4.20 |
| Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb | 5.25 | 5.25 |
| Galvanized barbed wire, Pittsburgh, cents per lb | 4.10 | 4.10 |

| | June 5 | June 18 |
|---|---|---|
| Galvanized wire, ordinary, Pittsburgh, cents per lb | 3.70 | 3.70 |
| Car window glass (single strength), first three brackets, A quality, New York, discount † | 80% | 80% |
| Car window glass (single strength, first three brackets, B quality), New York, discount | 80% | 80% |
| Car window glass (double strength, all sizes AA quality), New York discount | 81% | 81% |
| Waste, wool (according to grade), cents per lb | 14 to 17 | 14 to 17 |
| Waste, cotton (100 lb. bale), cents per lb. | 8 to 12½ | 8 to 12½ |
| Asphalt, hot (150 tons minimum), per ton delivered | ..... | ..... |
| Asphalt, cold (150 tons minimum, pkgs. weighed in, F. O. B. plant, Maurer, N. J.), per ton | ...... | ...... |
| Asphalt filler, per ton | $30.00 | $30.00 |
| Cement (carload lots), New York, per bbl | $2.90 | $2.90 |
| Cement (carload lots), Chicago, per bbl. | $3.05 | $3.05 |
| Cement (carload lots), Seattle, per bbl. | $3.13 | $3.13 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal | $1.66 | $1.83 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal | $1.68 | $1.75 |
| White lead (100 lb. keg), New York, cents per lb | 13 | 13 |
| Turpentine (bbl. lots), New York, cents per gal | 94 | $1.17 |

† These prices are f. o. b. works, with boxing charges extra.

Indian Reserve. It is reported that an extension will also be built to Mewata Park, south of the Armories.

**Wabash, Chester & Western Railroad, Chester, Ill.**—It is reported that arrangements are being made to electrify the Wabash, Chester & Webster Railroad, which extends from Mt. Vernon to Chester.

**Kingston, Jamaica**—The government of Jamaica is arranging to have a survey made of the water power of the larger rivers in Jamaica, to see if electrification of the railways is now feasible. The cost of coal and the necessity for considerable railroad extension, owing to unexpected agricultural developments, explain the proposed change.

**Frankfort & Shelbyville Traction Company, Shelbyville, Ky.**—F. W. Hinkle secretary and treasurer of the Frankfort & Shelbyville Traction Company, has announced that plans for the construction of the line from Frankfort to Shelbyville are progressing rapidly and that the line will be in operation by Jan. 1. It is reported that the company has secured options on rails, trolley wire, poles, right-of-way, three steel bridges, prices on grading, ballast, ties, etc., and that arrangements have been made whereby the Kentucky Traction & Terminal Company will provide the rolling stock. [March 8, '19.]

## Power Houses, Shops and Buildings

**Georgia Railway & Power Company, Atlanta, Ga.**—Improvements are being planned by the Georgia Railway & Power Company to its power station at Dalton estimated to cost $6,000.

**Union Traction Company of Indiana, Anderson, Ind.**—A 36 ft. x 100 ft. tract on Main Street, Anderson, has been purchased by the Union Traction Company for a station site. The company plans to build a terminal and office building next year.

**Louisville & Southern Indiana Traction Company, Louisville, Ky.**—New freight sheds wiill be constructed by the Louisville & Southern Indiana Traction Company at 441 South First Street, at a cost of $8,000.

**Eastern Massachusetts Street Railway, Boston, Mass.**—Work has been begun by the Eastern Massachusetts Street Railway on the remodeling of the Middlesex Street carhouse in Lowell into a repair and construction shop which will take care of all the cars on the lines in the Middlesex valley district.

**Brooklyn (N. Y.) Rapid Transit Company.**—Judge Julius M. Mayer, in the Federal District Court, has authorized Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, to purchase power property at Kent and Davison Avenues, Williamsburg, owned by the Brooklyn City Railroad, for about $225,000.

## Trade Notes

**Crouse-Hinds Company of Syracuse, N. Y.**, announces that P. A. Fuss has joined its staff in an advertising capacity after a number of years of service for the Thomas Edison Company and the T. G. Plant Company.

**Netherlands Legation at Washington** has just opened a commercial department for the purpose of fostering trade between the United States and Holland and is in a position to give commercial information about trade between the two countries to American merchants.

**Brunswick (Ga.) Cross-Arm Company** reports that it is placing orders for two additional fast-feeding machines and intends to build an addition to its plant 50 ft. x 100 ft., about doubling the present size, for the purpose of operating a complete planing mill and catering to export business.

**Foster Callahan**, recently a first lieutenant of field artillery in the United States Army, has returned to civil life as representative in several Southeastern states of the Safety Insulated Wire & Cable Company. Mr. Callahan formerly covered this same territory in another connection and is well known in the electric railway field.

**Carbolineum Wood Preserving Company**, Milwaukee, Wis., announces that it has lately centralized its business, doing away with all former branches, distributers and agents, except only the Pacific Coast branch. All distributing will be done from stocks carried at different points with headquarters at the Carbolineum Building, Milwaukee, Wis.

**James Leffel Water Wheel Company** has sold its plant in the Lagonda district, Springfield, Ohio, to the Robbins & Myers Company, and has acquired more extensive property in Springfield. Engineers and architects are at work on plans for a large, modern and fully equipped plant and construction work will be rushed so that the new plant will be ready for occupancy by Dec. 1. The company found itself cramped for factory space in its old quarters.

**H. F. Keegan Company, First National Bank Building, Chicago, Ill.**, announces its appointment as district sales agent for the Van Dorn & Dutton Company, gear specialist, of Cleveland, Ohio. The company has also secured the sales agency of the Eureka Company of North East, Pa., manufacturer of a complete line of commutators, commutator bars, controller parts, line material, trolley wheels, brushholders and springs and bushings.

**Dayton Insulating Die Company**, manufacturer of molded insulation products and dies for same, has just purchased the Edgemont Die Casting Company of Dayton, Ohio, manufacturer of white-metal castings, and will consolidate and operate under a new name. C. A. Kurz will be president and I. W. Detamore is also connected with the new organization. Ground was broken during the third week in May for a new plant, about 60 ft. by 120 ft., two stories, steel and concrete, situated at Edgemont, a suburb of Dayton, Ohio.

**Roller-Smith Company**, New York City, announces that it is now represented in St. Paul, Minn., by A. H. Savage, Pioneer Building. Mr. Savage will handle the company's various lines of instruments, meters and circuit breakers in Minnesota and North Dakota and part of Wisconsin and South Dakota. Mr. Savage prior to 1914 represented the Fort Wayne Electric Works in St. Paul, and in 1914 he became a representative of the Wagner Electric Manufacturing Company of St. Louis, he being now in charge of the St. Paul office of that concern. At the present time Mr. Savage is treasurer of the Dakota Light & Power Company of Flandreau, S. Dak., and is also president of the South Dakota Power Association. He has been in the Northwest for over eighteen years.

## New Advertising Literature

**Hemingway Glass Company, Muncie, Ind.**: Catalog No. 31 on Standard glass insulators.

**Underfeed Stoker Company of America, Chicago, Ill.**: Pamphlet describing the Jones automatic cleaning underfeed stoker.

**Bridgeport Brass Company, Bridgeport, Conn.**: Bulletin No. 12 on the reasons for and properties of Phono-Electric wire.

**Irving Iron Works Company, Long Island City, N. Y.**: A thirty-six-page catalog (2A) covering "Irving subway" fireproof ventilating flooring.

**Electrical Manufacturing Company of Cleveland**: A sixty-eight-page catalog (D), covering knife switches, panelboards, iron cabinets and switchboards.

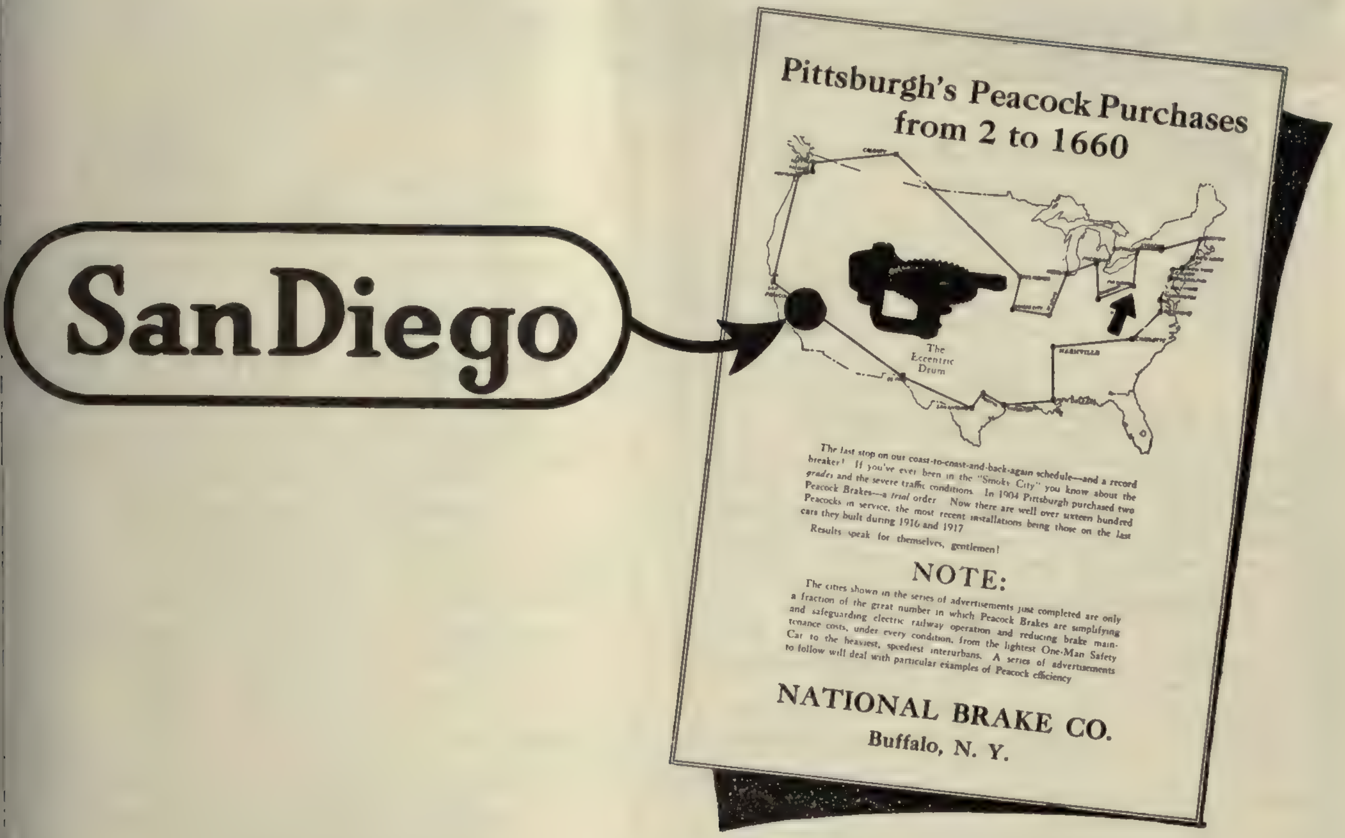
**Northern Equipment Company, Erie, Pa.**: Pamphlet entitled "Proposal and Specifications for the Copes System of Boiler Feed Control."

**Waterbury Battery Company, Waterbury, Conn.**: Circular illustrating and describing the Waterbury "unit cylinder" primary battery cell (RSA signal cell).

**Allis-Chalmers Manufacturing Company of Milwaukee**: A monthly bulletin containing a list of the centrifugal pumping units it has available for shipment.

**General Electric Company, Schenectady, N. Y.**: Bulletins Nos. 47,417, 47,443 and 47,482, describing respectively type FP-7, type FK-13 and type FK-52B oil circuit breakers.

**Murray Iron Works Company, Burlington, Iowa**: Catalog No. 85 of ninety-five pages, describing and illustrating its Corliss marine, pumping and vertical engines, air compressors, tubular, marine, portable and water-tube boilers, and rocking grates.


San Diego
The Eccentric Drum

### Pittsburgh's Peacock Purchases from 2 to 1660

The last stop on our coast-to-coast-and-back-again schedule—and a record breaker! If you've ever been in the "Smoky City" you know about the *grades* and the severe traffic conditions. In 1904 Pittsburgh purchased two Peacock Brakes—a *trial* order. Now there are well over sixteen hundred Peacocks in service, the most recent installations being those on the last cars they built during 1916 and 1917.

Results speak for themselves, gentlemen!

NOTE:

The cities shown in the series of advertisements just completed are only a fraction of the great number in which Peacock Brakes are simplifying and safeguarding electric railway operation and reducing brake maintenance costs, under every condition, from the lightest One-Man Safety Car to the heaviest, speediest interurbans. A series of advertisements to follow will deal with particular examples of Peacock efficiency.

NATIONAL BRAKE CO.
Buffalo, N. Y.

# It's Mighty Glad We Are to Add San Diego

—the coming New York of the Pacific Coast, which we omitted in our recent series entitled "Peacock Brakes from Coast to Coast." We can't understand how we ever overlooked this wonderful city of Southwest California.

There are between 250 and 300 sets of our brakes on the cars of the San Diego Electric Railway, and Mr. Homer MacNutt, Supt. of Motive Power, says "they are giving good satisfaction."

**NATIONAL BRAKE COMPANY**
**Buffalo, N. Y.**

# Bankers and Engineers

**Ford, Bacon & Davis,**
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

**STONE & WEBSTER**
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

**SANDERSON & PORTER**
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

**DWIGHT P. ROBINSON *and* COMPANY**
Incorporated
*Design — Construct — Finance — Manage*
UTILITIES INDUSTRIALS
1 Broadway, New York

**A. L. DRUM & COMPANY**
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

**Scofield Engineering Co.** Consulting Engineers
PHILADELPHIA, PA.
POWER STATIONS GAS WORKS
HYDRAULIC DEVELOPMENTS ELECTRIC RAILWAYS

**THE P. EDW. WISH SERVICE**
DETECTIVES
*Suite* 1710 Park Row Bldg., New York
*Suite* 1102 Board of Trade Bldg., Boston

**THE J. G. WHITE COMPANIES**
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK
LONDON CHICAGO

**JOHN A. BEELER**
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

**REPUBLIC ENGINEERS, INC.**
CONSULTING AND CONSTRUCTING ENGINEERS
*Valuations Reports Investigations*
*Designs Construction Management*
60 BROADWAY, NEW YORK
CLEVELAND, OHIO Illuminating Bldg.
YOUNGSTOWN, OHIO Mahoning Bank Bldg.

**WOODMANSEE & DAVIDSON ENGINEERING CO.**
ENGINEERS
MILWAUKEE First National Bank Bldg.
CHICAGO 784 Continental & Commercial National Bank Bldg.

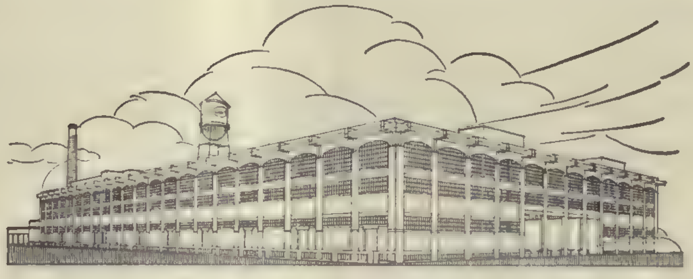
**ENGELHARDT W. HOLST**
*Engineer*
*Reports, Appraisals, Reorganizations*
683 Atlantic Ave., Boston, Mass.

**E. W. Clark & Co. Management Corporaton**
*Engineers*
Power Plants, Electric Power Transmission and Industrial Application
Huntington Bank Buiilding, Columbus, Ohio

**H. M. Byllesby & Company, Inc.**
NEW YORK Trinity Bldg.
CHICAGO No. 208 So. La Salle St.,
TACOMA Washington
Purchase, Finance, Construct and Operate Electric Light Gas, Street Railway and Water Power Properties
Examinations and reports Utility Securities Bought and Sold

**ELECTRICAL TESTING LABORATORIES**
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



AMERICAN CAN CO., FACTORY, MAYWOOD, ILL.

# INVESTIGATE BEFORE YOU INVEST

No matter how efficient in its own business, no organization can dispense with competent advice on its plant extensions, any more than a lawyer can dispense with a doctor when he is sick or a doctor dispense with a lawyer when he sues a client for his bill.

And pursuing the simile further, merely hiring any organization of engineers or contractors that makes plausible claims, without scrutinizing its credentials of ability, is as dangerous as hiring a lawyer or a doctor without regard to his record.

The Thompson-Starrett Company is not only competent to undertake your plant extensions, but its advice is constantly solicited and followed in the investigative stages of construction problems, by organizations which want specialized advice before they commit themselves to a contract.

*Our Advice is as Good as Our **Service***

**THOMPSON-STARRETT COMPANY**
**INDUSTRIAL CONSTRUCTION**
**NEW YORK**
**CHICAGO** **PITTSBURGH**

# More electric railways

are right now *thinking* about and making plans for improvements, expansion and reconstruction than ever before in the history of the field.

When the hampering hand of unwise public restrictions is lifted these new developments that electric railway men are now thinking about will be made effective and *quickly.*

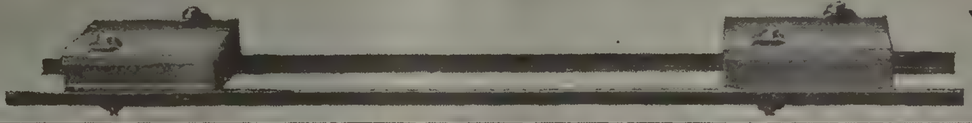
That heavy hand is shortly going to be removed. No man who studies the situation can doubt that. The time to sell your goods is when the buyer is *thinking* about what he will do. Not after he has *made up his mind* what, when, and where to buy. *Now* is the time to *advertise* electric railway commodities.

The Electric Railway Journal covers all departments of the industry—north, east, south and west. Circulation figures open to all and backed by A. B. C. statements.

## Electric Railway Journal

Member Audit Bureau of Circulations
Member Associated Business Papers, Inc.
Tenth Ave. at 36th St., New York

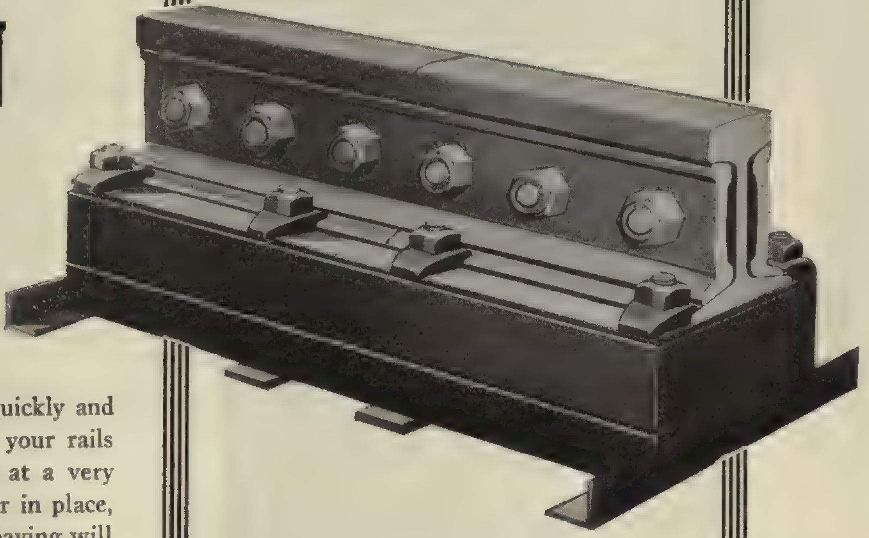
# The MECHANICAL RAILWAY TIE



# Correct Those Uneven Joints Without Interrupting Schedules

Do it with a

## DAYTON Rail Joint Booster



The Dayton Rail Joint Booster will quickly and automatically correct uneven joints in your rails without the least delay to traffic and at a very slight cost. With the rail joint booster in place, the track will *always* be level and the paving will not buckle.

Installation is simple and inexpensive. Excavate the track bed around the joint to a depth of about fourteen inches below the rail base. Cut the old tie in two and remove the ends supporting the joint. Clamp the booster into place and weld it full length, draw up the bolts and jack the track to its proper level. Replace the pavement and the job is finished.

**Big results with little cost.**

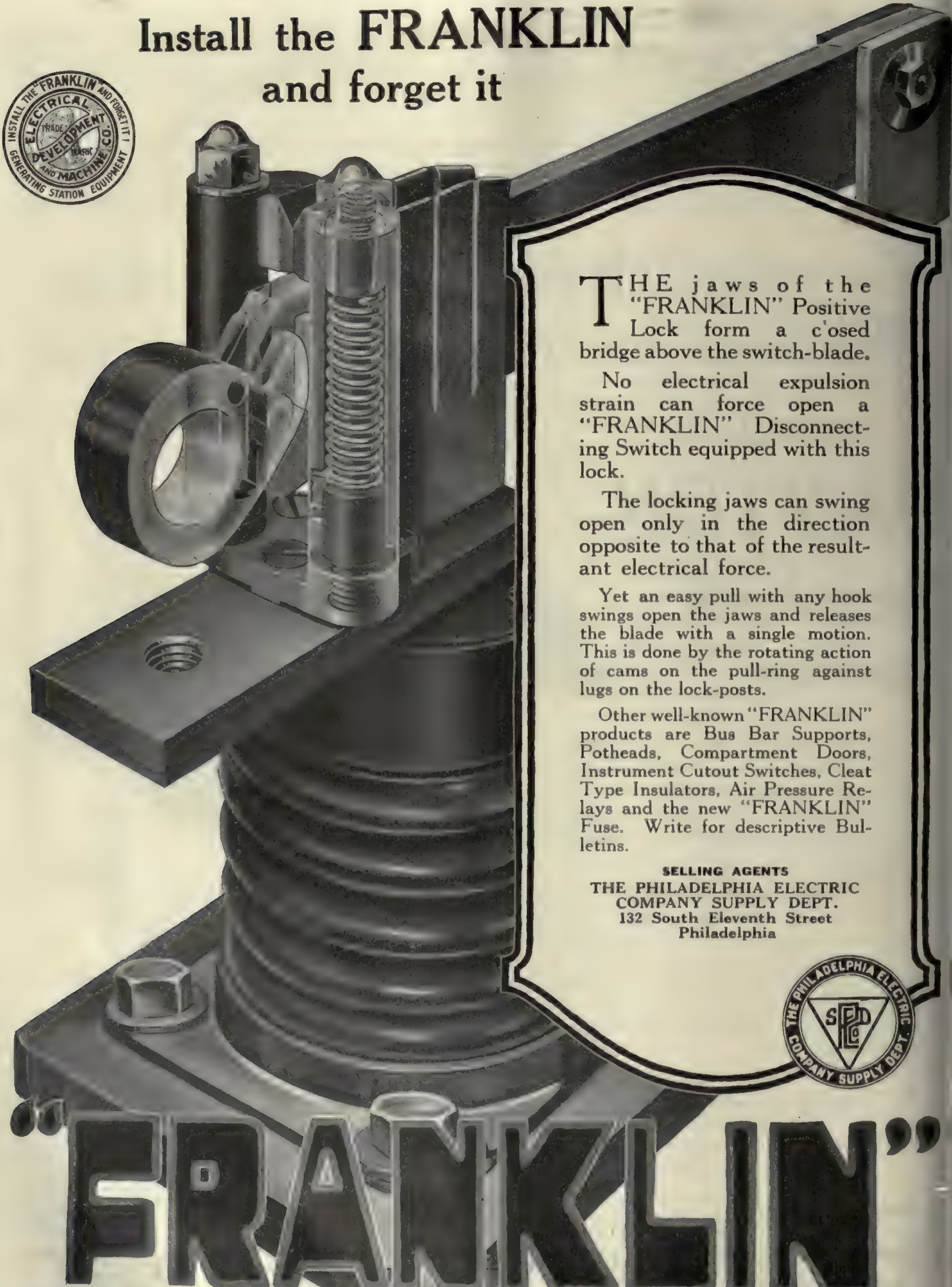
***Write for full details.***

**DAYTON**
**Rail Joint**
**Booster**

THE DAYTON MECHANICAL TIE CO.
**704 Commercial Bldg.**
DAYTON, OHIO

# Install the FRANKLIN and forget it

INSTALL THE "FRANKLIN" AND FORGET IT!
ELECTRICAL DEVELOPMENT AND MACHINE CO.
TRADE MARK
GENERATING STATION EQUIPMENT



THE jaws of the "FRANKLIN" Positive Lock form a closed bridge above the switch-blade.

No electrical expulsion strain can force open a "FRANKLIN" Disconnecting Switch equipped with this lock.

The locking jaws can swing open only in the direction opposite to that of the resultant electrical force.

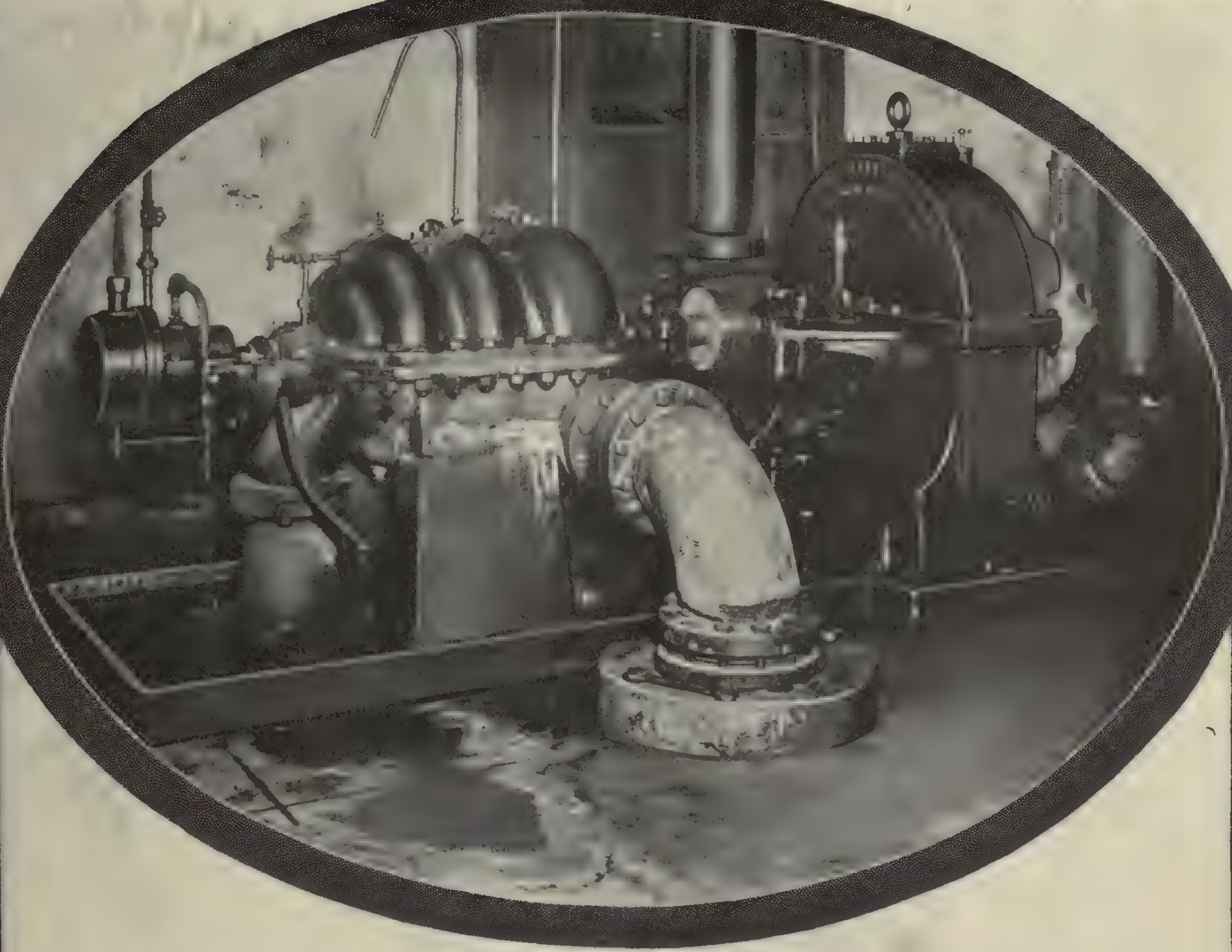
Yet an easy pull with any hook swings open the jaws and releases the blade with a single motion. This is done by the rotating action of cams on the pull-ring against lugs on the lock-posts.

Other well-known "FRANKLIN" products are Bus Bar Supports, Potheads, Compartment Doors, Instrument Cutout Switches, Cleat Type Insulators, Air Pressure Relays and the new "FRANKLIN" Fuse. Write for descriptive Bulletins.

**SELLING AGENTS**
THE PHILADELPHIA ELECTRIC
COMPANY SUPPLY DEPT.
132 South Eleventh Street
Philadelphia

**"FRANKLIN"**

**GENERATING STATION EQUIPMENT**



# Idle 30 Days in 5 Years—But It Wasn't the Terry's Fault

The Memphis Street Railway Company, Memphis, Tennessee, installed a Terry Turbine in 1913. It is direct connected to a three-stage centrifugal boiler feed pump. The pumping head is 580 feet, r.p.m. 2000, steam pressure 200 lbs.

January 24, 1919, the Chief Engineer of the Power Station wrote: "The turbine has been idle but about 30 days from installation to date—this time being consumed in repairing the pump. The repairs on the turbine consisted of two new bearing bushings."

Then the Chief Engineer adds: "It is performing very satisfactorily, as the above statement will verify."

**Many electric railway companies are now getting the advantages of Terry Reliability and low upkeep cost, but that's not all. Write for Bulletin 2511 for the *many* reasons why you should**

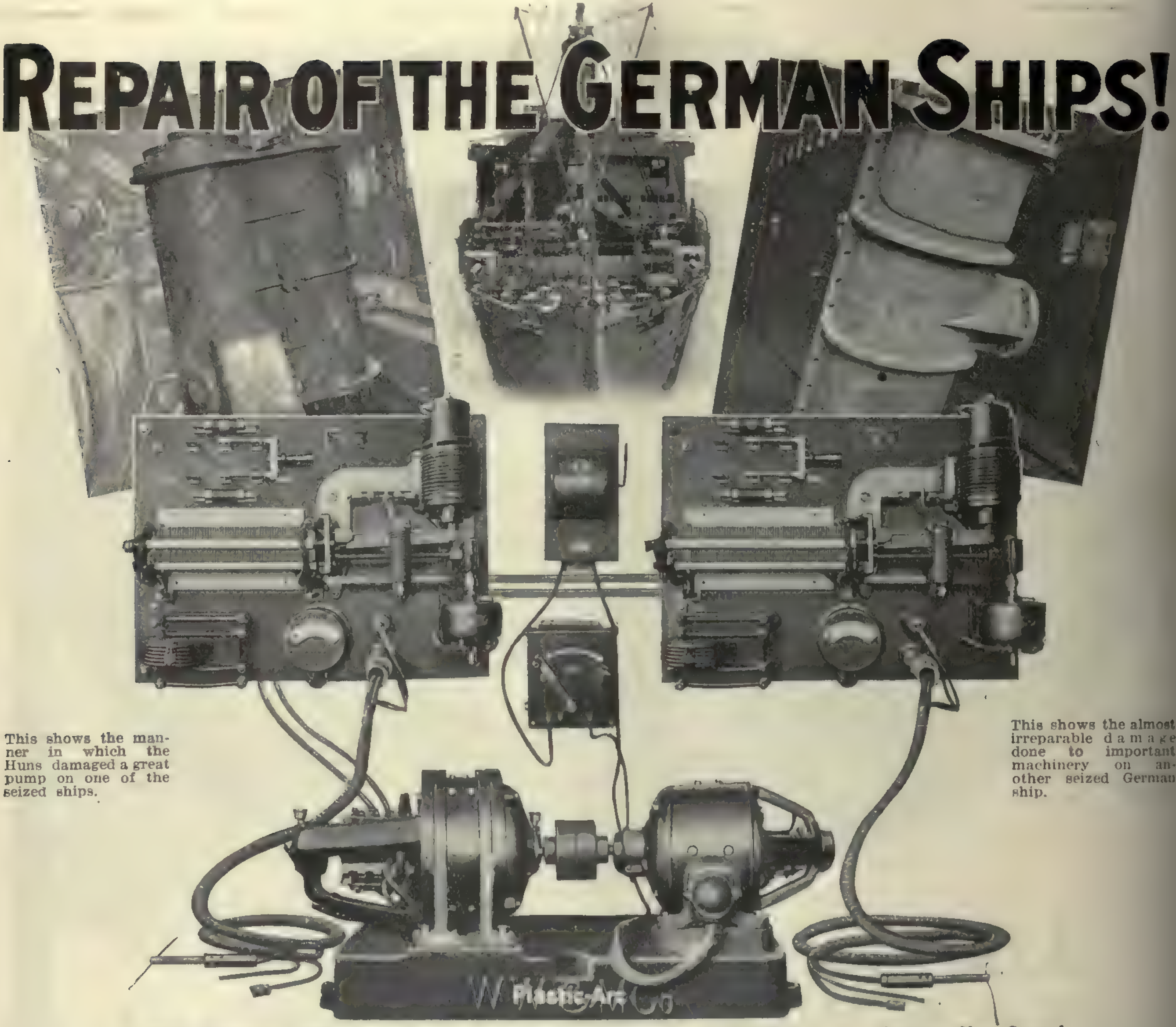
***Specify Terry for driving your auxiliaries.***

**The Terry Steam Turbine Co., Hartford, Conn.**

**TERRY TURBINE DRIVE**

T-605

REPAIR OF THE GERMAN SHIPS!



This shows the manner in which the Huns damaged a great pump on one of the seized ships.

This shows the almost irreparable damage done to important machinery on another seized German ship.

No Burnt Metal—No Voids

Constant Heat Control

WILSON **Plastic-Arc** WELDER

and Certified Welding Metal

When the United States Government set about making QUICK repairs on the ships wantonly damaged by the Huns, they used the Wilson **Plastic-Arc** Welder—and the ships sailed! Electric Railways who want to make quick, economical repairs by welding will do well to follow the Government's lead. The Wilson **Plastic-Arc** Welder, together with **Plastic-Arc** Certified Welding Metal (Patented) will successfully and quickly weld any metal any thickness or any bulk, IN PLACE, without preheating, distortion, dismantling, or annealing.

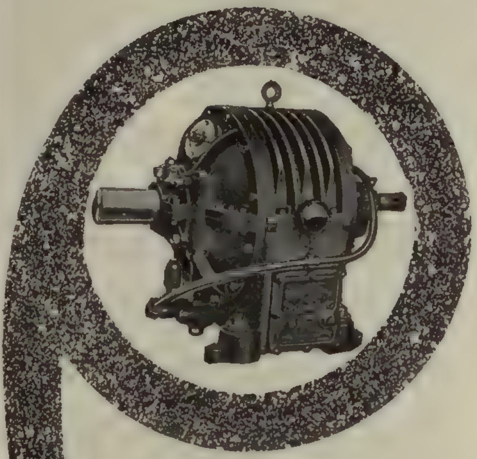
Certified Metals insure permanent welds. Their use gives far more satisfactory results than you can get with *ordinary* welding metals.

There are eight grades of **Plastic-Arc** Certified Welding Metals. Each grade has been carefully developed to give maximum results in a definite line of work. For instance, Grade 6 for steel shafts and boiler flues; Grade 9 for cast steel parts, frogs, crossings, switch points, etc. And so forth through all the grades.

Every foot of **Plastic-Arc** Certified Welding Metal (Pat.) is guaranteed perfect and uniform for its particular use.

**Wilson Welder & Metals Company, Inc.**
5 Rector Street, New York

# *How a Low Speed Water Wheel Drives a High Speed Pump—*



## TURBOGEAR

FAST PATENTS

In the installation pictured below, Turbo Gear effects a 1 to 4.13 speed increase in a limited space and with all the shafts, of the turbine, Turbo Gear and pump, in the same straight line.

The transmission being pure torque, with all side strain on bearings and shafts eliminated, frictional resistances are reduced to an extremely low point, with the extraordinary result that over 98 per cent. of the power delivered to the driving shaft of the turbine is transmitted, at the required change of speed, to the pump.

Turbo Gear, equally adapted to step speed up or down and made in all sizes from 1 to 20,000 hp., forms an ideal drive for stokers, fans, compressors, circulating pumps, condensors, conveyors, and in all conditions where the speed of a driving unit must be modified, to suit the requirements of the driven machine.

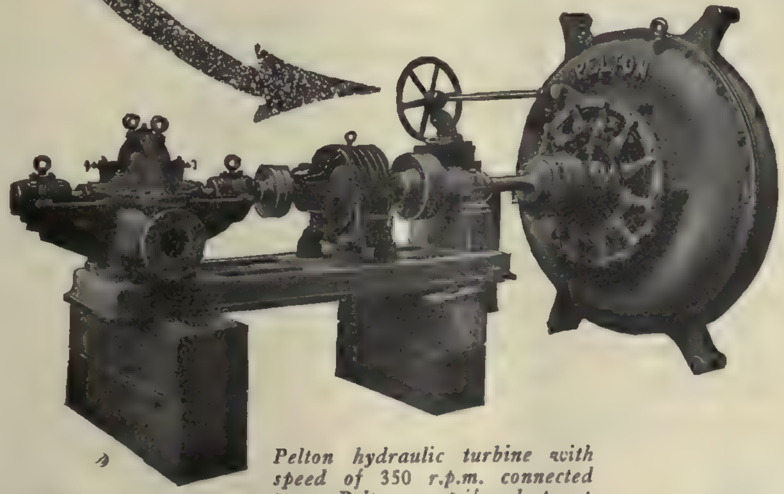
***Write for a copy of Bulletin 101.***

## The Poole Engineering & Machine Co.

***Manufacturers of Gears and Power Transmission Machinery***
***Since 1843***

**Works: Baltimore, Md., U. S. A.**

**General Sales Office**
**50 Church St.**
**New York**



*Pelton hydraulic turbine with speed of 350 r.p.m. connected to a Pelton centrifugal pump through at 35 hp. Turbo Gear with a capacity of 800 g.p.m. at 1450 r.p.m.*

# TOLEDO

## Serving the Milwaukee Railway and Light Company

typical Toledo installation in a progressive Electric Railway where *handling efficiency* is recognized as of vital importance.

Toledo Cranes will serve you quickly, smoothly and *for years* without delay or more than normal maintenance.

Their scope is limitless—they will lift one moment a motor—the next a piece of special work—the next an entire car frame—and so forth.

Capitalize *now* the care and experience that put the name Toledo foremost in its field today.

**The Toledo Bridge & Crane Co.**
**Toledo, Ohio**

OFFICES:

New York
52 Broadway

Philadelphia
2013 Market St.

Pittsburgh
203 Oliver Bldg.

Chicago
549 Washington Blvd.

Cleveland
725 Citizens Bldg.

San Francisco
Rialto Bldg.

Buffalo
610 Iroquois Bldg.

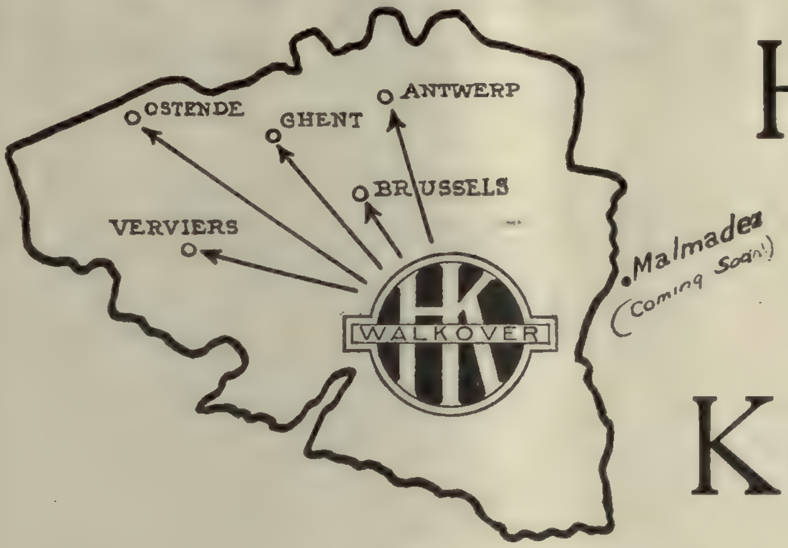
Boston
141 Milk St.

Seattle
Hoge Bldg.

St. Louis
Federal Reserve Bank Bldg.

Kansas City, Mo.,
Finance Bldg.

# CRANES



# Hale and Kilburn In Belgium

Before Belgium—not for the first time in its history—became the cockpit of Europe, it had one of the best networks of tramways and light railways in the world. We don't know what has been left of the equipment, but—

As an American proud of your country's achievements in peace as in war, you will be pleased to learn that thousands of the car seats on these lines were the product of Hale and Kilburn!

Yet Belgium has always been a great manufacturing country which did not have to go far afield for railway car seating unless that equipment was as famous in its line as Pears is for soap and Gillette for razors.

But you don't have to send across the seas for Hale and Kilburn seats. They are at your very door for the asking in any style and for any service—whether for interurban, suburban or city cars right down to the last word in light-weight safety cars.

**HALE & KILBURN**
No. 108-AV Stationary Seat
*For One-Man Safety Cars*

This unmatchable H&K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

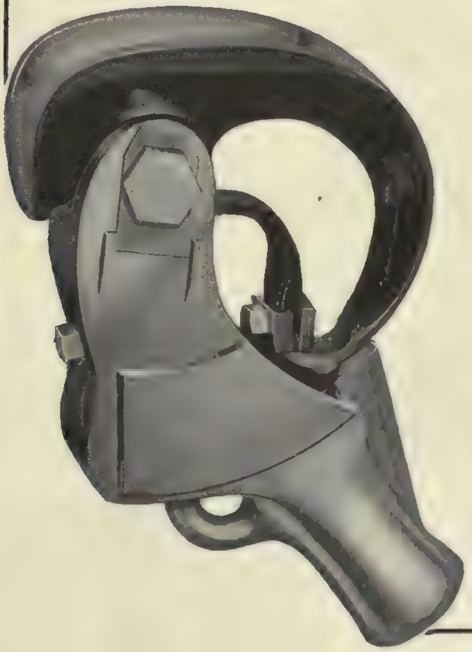
*Next time Hale & Kilburn Seats in France*

## Hale & Kilburn Corporation

Philadelphia New York Chicago St. Louis Detroit
Washington Atlanta San Francisco Dallas Louisville

LONDON—G. D. PETERS CO., LTD., 15 DEANS YARD, WESTMINSTER

# Compare the Cost!



*Ordinary Trolley Wheel*

***.0014 Cent***

*per set per car mile.*

**MILLER
TROLLEY SHOES**

***.0005 Cent***

*per set per car mile.*

About 50 per cent. of the Berkshire Street Railway cars are equipped with Miller Trolley Shoes. The cars are 28-ton interurban.

The company has been using Miller Shoes since July, 1917. They purchased 200 sets. A recent test of two Miller Shoes gave 7000 miles each—while the ordinary trolley wheel was ready for scrap at the end of 2500 miles. The Miller Shoes only cost .0005 cent per set per car mile—the wheels .0014 cent per car mile. 200 sets of Miller Shoes give 1,800,000 more miles than 200 sets of wheels.

You can equip *your* cars with Miller Trolley Shoes without changing present poles or bases. Today hundreds of cars on scores of railways of every character of service are equipped with them—and in every case the user reports a life far in excess of the trolley wheel and a wire wear that is much less than it would be with a higher tension contact that does not *hug the wire as tenaciously as the Miller Trolley Shoe.*

Give the Miller Shoe a chance to prove itself on *your hardest line.*

## MILLER TROLLEY SHOE CO.

West Newton, Mass.

# When You Begin to Operate the Safety Car

## *All eyes will watch you, from trolley catcher to wheel guard*

You know that Safety Car operation doesn't simply mean locking up the back platform; or just adding a coat of paint or giving the interior another dash of whitewash.

It means giving the public more, better and SAFER service than it had before.

That's the kind of service that you are going to give; and to make that service SAFE beyond criticism in all respects you will want to assure yourself that that Safety Car will have as good protection **under** the platform as **on** the platform.

To get that protection you will insist upon the life-saving device that has already made good for you and for others on many thousands of cars, namely,

## The H-B Life Guard

The Standard Guard for the Standard Car

The Consolidated Car Fender Co.
Providence, R. I.

General Sales Agents:
Wendell & MacDuffie Co.
61 Broadway, N. Y.

Columbia-Made Trolley Poles Are Made Right

Your Overhead Expenses
Will Show a Marked Reduction
If Your Overhead Equipment Is

COLUMBIA-MADE

Thousands of

Columbia Trolley Poles

are ready for immediate shipment

For 1½-inch and 2-inch Base Harps and for lengths
11 feet to 15 feet.

**Columbia Machine Works & Malleable Iron Co.**
Atlantic Avenue and Chestnut Street, Brooklyn, N. Y.

*Here's a list of other Columbia Products*

TOOLS

Armature and axle straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd., Toronto, Ont.

CAR EQUIPMENT

Armature and axle bearings
Armature and field coils
Bearings (axle and armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

# They may both *look* alike—*but* what about the *Metal Quality?*

One is an ordinary trolley wheel—nothing more. The other is a *specialized product,* worked out by expert chemists and metallurgists, in cooperation with Mechanical Officials of various roads, and made by a special method, of only pure new metal.

Maximum conductivity and full wheel mileage depends wholly on the quality and texture of the metal. Wheels made from scrap material, or those very hard, produce disastrous results. What is needed is a comparatively *soft, yet very tough metal*—the kind that is used in V-K Oilless Trolley Wheels. Our laboratory worked out the alloy—and our foundry developed methods of casting whereby absolute fidelity to design and proper balance are secured.

Tests and service records have proved the V-K Oilless Trolley Wheels give more mileage, show higher efficiency, and a lower net cost than any other wheels, save the wire, and reduce current waste. Their use spells economy all along the line.

***We invite your inquiries and investigation.***

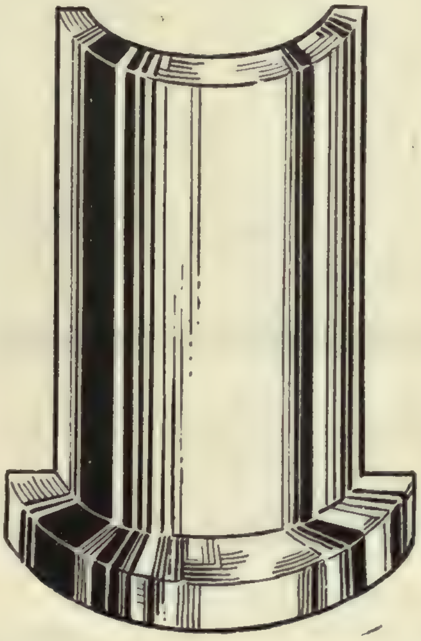
**More-Jones Brass & Metal Company**
**St. Louis, Mo., U. S. A.**

**V-K**

# Vim Bronze Bearings

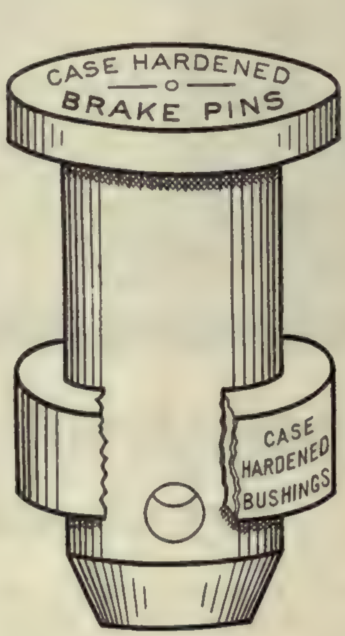
for Trucks and Motors

*Guaranteed Against Breakage*



# Boyerized Pins and Bushings

*They are Case Hardened*



# Boyerize Your Line!

There are three reasons why you should Boyerize your line: Safety—Economy—Mileage.

Whether you operate city cars or high-speed interurban cars; whether your load is light or heavy, these Boyerized Products will keep your cars out on the road, giving safe, continuous service and low maintenance.

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**Boyerized Wearing Plates between the Bolster and Bolster Carrier.**
**Boyerized Wearing Plates between the Pedestal Straps and the Journal Box.**

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ELECTRIC RAILWAY SUPPLIES
Bemis Car Truck Company
SPRINGFIELD MASS

Plant of the Standard Forgings Company, Indiana Harbor, Indiana

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In 1918

10 large Elec. Ry. Co's. operating 15,529 cars

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Their total purchases were

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"Tool Steel" gears + pinions

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# Study the Comparative Results of Open Hearth and Electric Steel Armature Shafts for Electric Railway Service

**Here they are**

**(Columns showing results obtained in test)**

| Properties | Open Hearth Steel | Electric Steel General Steel Co. |
|---|---|---|
| Ult. Strength, lbs. per sq.in. .... | 91,200 | 107,700 |
| Elastic Limit, lbs. per sq.in. .... | 46,000 | 69,950 |
| Elongation in 2 in. ............ | 22.2% | 23.5% |
| Reduction of Area ............ | 44.8% | 50.0% |
| Fracture | Silky, small cup. | Silky, full cup. |
| Elastic—Torsion, lbs. sq.in. ..... | 16,750 | 33,700 |
| Shearing Strength, lbs. sq.in. .... | 62,400 | 76,000 |

The comparative results given here were obtained from tests taken from an ordinary Open Hearth steel armature shaft, and one taken from a high-grade steel, made in a "Pittsburgh" electric furnace. Both were the normal product. Heat treated in each case.

We are equipped to handle the forging of axles and armature shafts from our own manufactured electric furnace steel.

*We Solicit Your Inquiries*

## GENERAL STEEL CO.

Public Service Building, MILWAUKEE, Wis.

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"Taint economical to build cars to last forever. We agree with Electric Railway Journal.

A car is a production unit.

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Fact looms up that this matter of light weight Safety Cars is food for Specialists.

Cars from "Quality Shops" last as long as you want them to.

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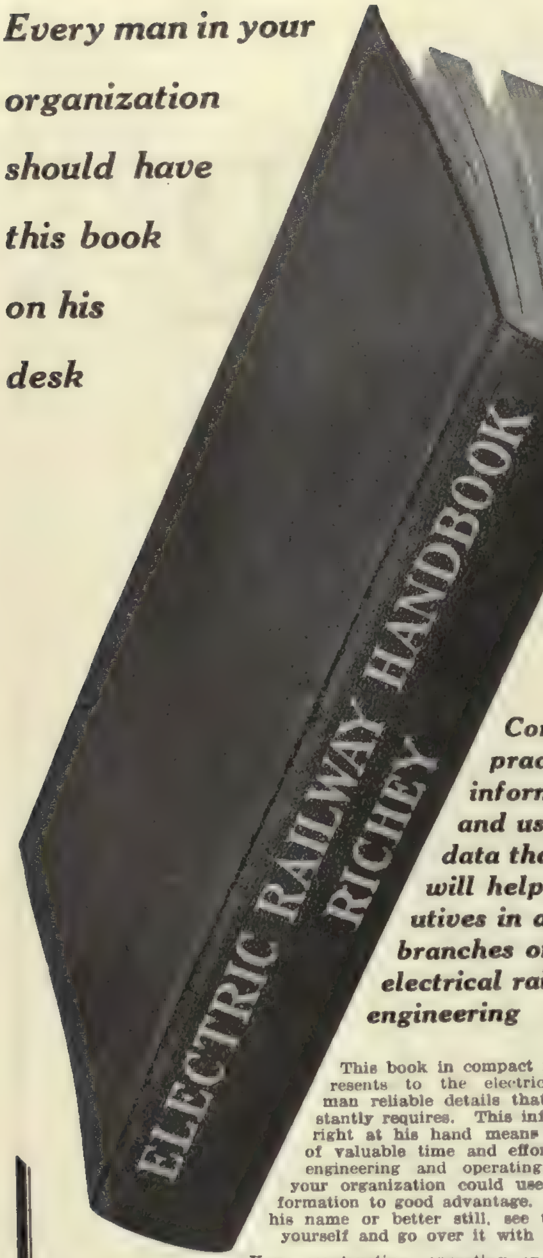

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### It doesn't deteriorate

That's the big story of White's Porcelain Trolley Hanger.

Composed of three simple parts—that make hanging and aligning on the span wire a quick and easy job with

## WHITE'S
### Porcelain
## Trolley Hanger

The glazed porcelain insulation is built heavy—to stand the knocks when the trolley jumps—the insulation doesn't "break down."

The sherardized malleable iron yoke don't rust—it lengthens the service life of the hanger.

The bolt is a standard—we can furnish it in sherardized steel or bronze—or you can use a stock bolt.

Send for a sample. You then will *see* what we mean by economy and long service. Let us quote you on complete hangers or parts for

***Immediate Delivery***

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TO get the best results you must have materials suited directly to your requirements—Rome Wires and Cables are each and all designed to meet a specific demand.

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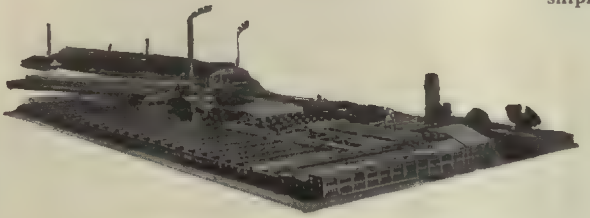
Trolley wires, feeder cables, magnet wires, etc., all of the high standard of quality that the name ROME exemplifies. Our facilities enable us to have an order on the way in a mighty few hours after we get it—that's ROME service—in keeping with our friends' expectations—prompt shipment.



***Rome***
***Wire Company***
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***All operations from wire bar to finished product in this plant.***

Rome-Wire

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**No More Split Switches**

**Simple and Indestructible**

A safety necessity for street and interurban railways. Locks both right and left—no *chance* of a split switch—few parts—safe, dependable, simple in construction and easily installed. Fits any rail section. Used by many prominent roads. Send us a trial order and put them to the test.

This switch lock is exceedingly simple in design, having very few parts, none of which is complicated. The box is absolutely tight, to prevent loss of oil, with which it is filled. It has a stuffing box where the connecting rod passes through to prevent the entrance of water or dirt.

The heaviest traffic will not interfere with or damage the Weiss Switch Lock.

**You can install one on approval, for 30 days' trial, but be sure to give measurements from top of rail to center of bolt holes.**

***Watertight***
***Non-Freezable***
***Mud-Proof***
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### For Electric Railway Repair Shops

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including steam hammers and electric traveling cranes.

*Correspondence Invited.*

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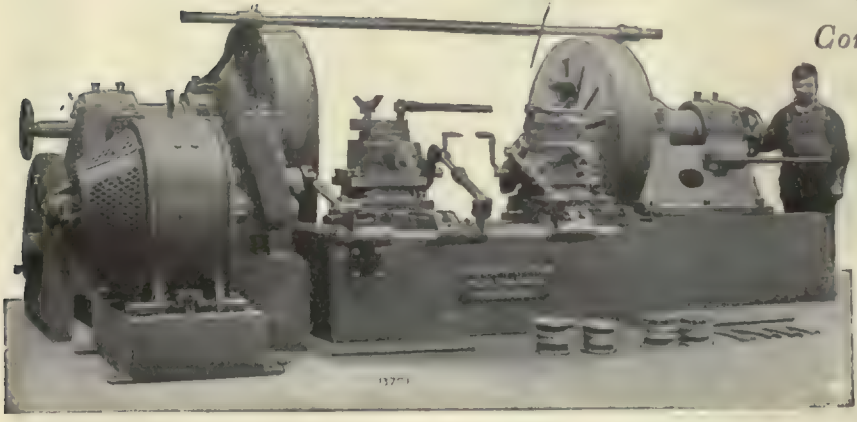

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# EARLL

Because we have devoted our years of experience to the manufacture of trolley Catchers and Retrievers exclusively—the only concern in America who has—we are able to produce the kind of catchers and retrievers that will satisfy your demands of service and maintenance.

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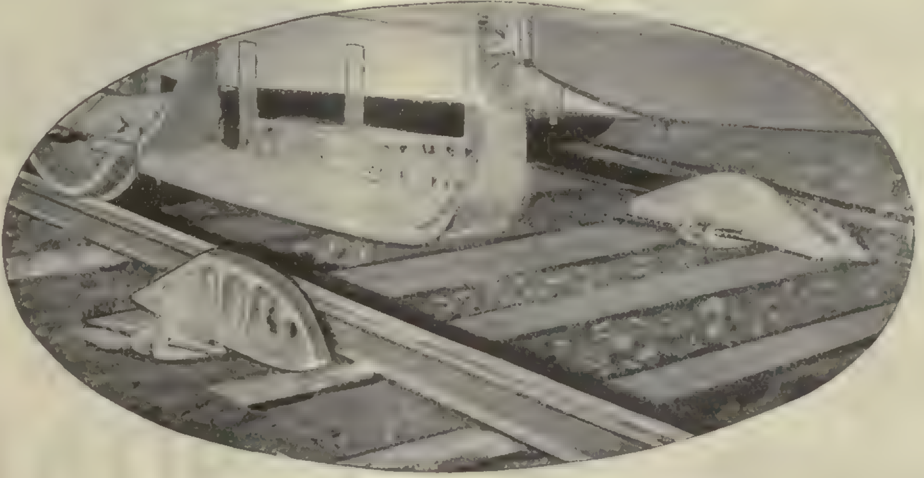
NO SPIKING REQUIRED—CLAMPS HOLD REPLACER



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Work put on machines too large and heavy is profitless. It's the same in traction affairs—a big heavy costly car with only a few passengers is a losing game—with a smaller, less power-consuming car it is profitable.

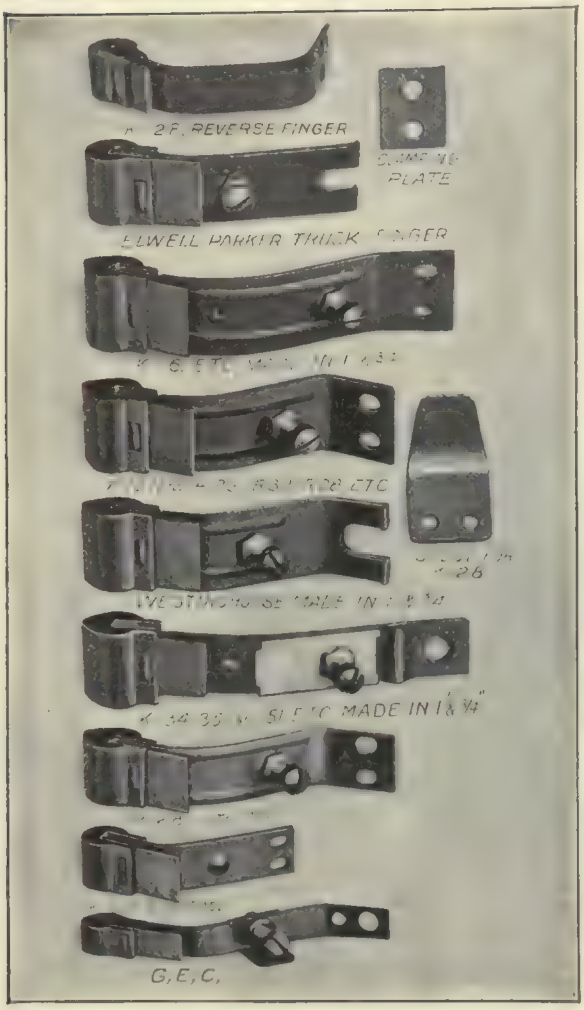
## STAR LATHES

are strong, compact, accurate. They do the work of larger, costly lathes, as well—and usually better—and at much less cost. They take up less room, cost less and consume less power. "Star" Lathes are built in 9-in., 11-in., 12-in. and 13-in. swing sizes and there is a full line of attachments available.

These lathes have many features of special merit for accuracy and rapid operation.

**The "Star" Way**

**The Seneca Falls Mfg. Co., 385 Fall St., Seneca Falls, N.Y.**



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## Reversible Controller Fingers
## Save
## Time, Labor and Money

They save time because the renewable tip can be snapped on to the finger in place of the worn tip without removal or adjustment.

They save labor because anybody of ordinary intelligence can do the replacing. No labor needed to keep them in repair.

They save money because the renewable tip is long wearing, reversible and eliminates the scrapping of the entire finger.

Half of the large electric railways in America are using Trigger-Lock Reversible Controller Fingers.

**Trigger-Lock**
**Reversible Controller Finger**
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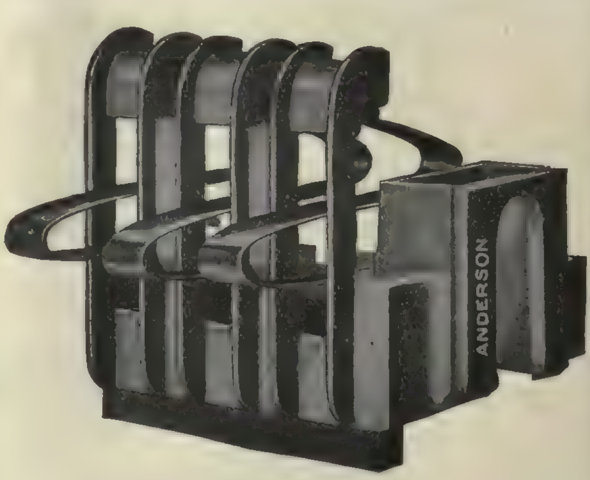

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Machining is done on machines designed for this special purpose, assuring perfect balance, which gives greatest possible mileage with least wear and tear.

**Bulletins on Eureka Controller Parts, Commutators Brushholders, Trolley Wheels and Line Material gladly sent on request.**

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# Safety—Economy—Efficiency
# GRIFFIN F. C. S. WHEELS

Maximum Mileage

Minimum Cost

For Street and Interurban Railways
We have adequate facilities at each foundry for mounting wheels on axles

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McCormick Building, Chicago, Ill.

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The Electric Railway has a wide service.

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The guarantee reads: "We will replace all B. P. heat-treated gearing that does not last four times as long as standard untreated cast steel gearing in identical service, the adjustment to be based upon the percentage of actual to guaranteed life."

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for your immediate requirements. These warehouses are maintained by Carnegie Steel Company for the convenience of its customers and are located at the following places:

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Oil immersed relay gives reliability and low maintenance. Easy and economical to install.

It will pay you to know *all* about Nachod Signals Write.

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*Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to verify these facts.*

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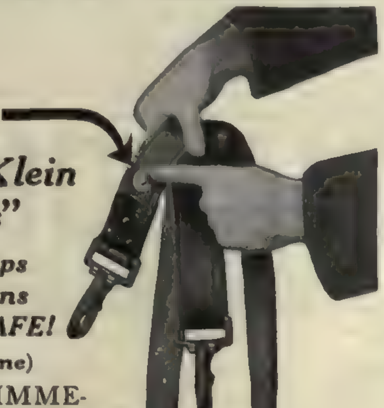

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***"Mathias Klein & Sons"***

***on Safety Straps and Belts means that they are SAFE!***

***(Look for the name)***

We can make IMMEDIATE SHIPMENT of leather goods — belts, safety straps, climber straps, tool bags, etc.

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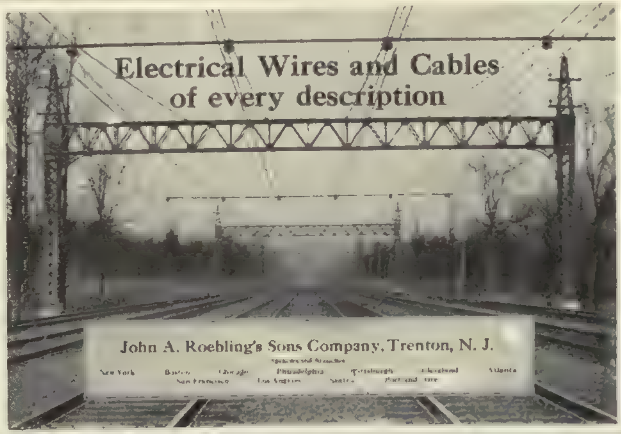
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Your best insurance against insulator breakage
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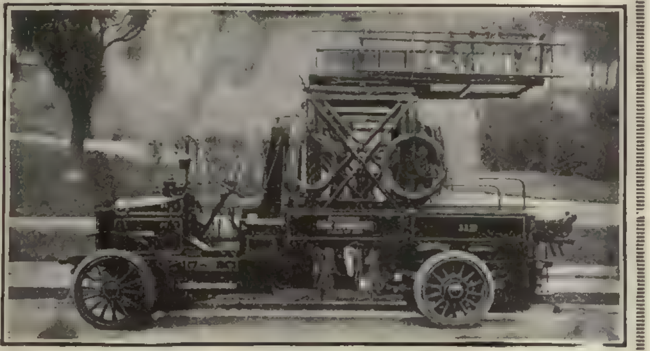

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is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

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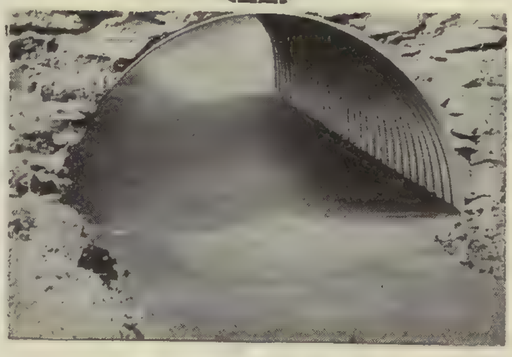

A 72-inch Flat Bottom

This gives large drainage capacity and requires but little headroom. In smaller sizes this makes a splendid culvert, while larger sizes make very satisfactory small bridges. It's just one form of

"ACME" (NESTABLE) CORRUGATED CULVERTS

Made of
Galvanized Anti-Corrosive NO-CO-RO METAL

"ACMES" because of their sectional character are easily handled and transported even in the largest sizes.

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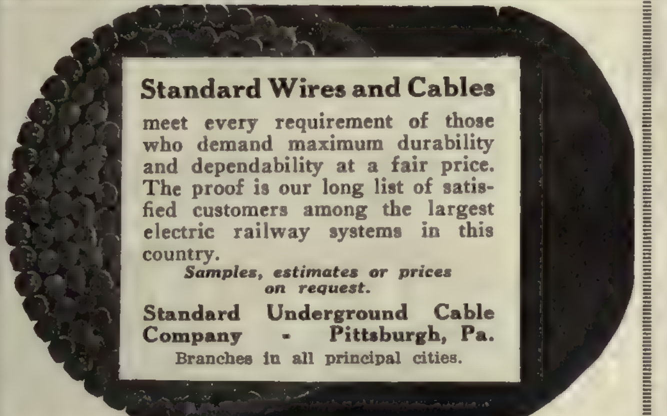

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meet every requirement of those who demand maximum durability and dependability at a fair price. The proof is our long list of satisfied customers among the largest electric railway systems in this country.

*Samples, estimates or prices on request.*

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Branches in all principal cities.

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TRACK WORK OF EVERY DESCRIPTION.
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Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. Manganese Construction a Specialty.

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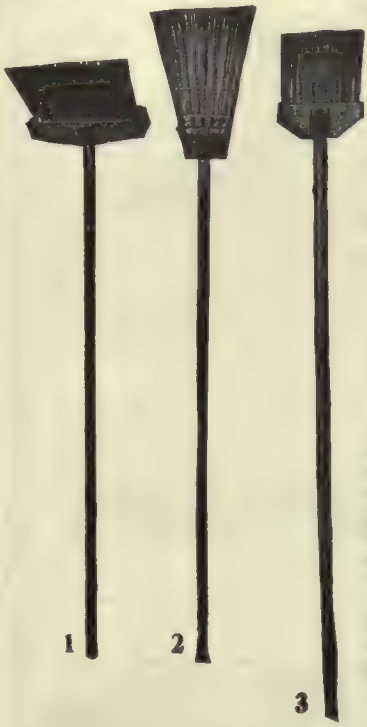

A Great Combination

No. 1. Flat Wire, to sweep crossings.

No. 2. Split Bamboo, to handle light dirt and snow in the frogs, switches, and curves.

No. 3. Flat Wire, to remove ice, slush and mud from the same places and a chisel point on the end of the handle to loosen the ice and crust.

None superior are produced for purposes intended. No. 1 supplied with or without handles, and No. 2 and 3 have a chisel on the end of handle to cut the crust and ice, but are supplied without chisel if desired.

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OXY-ACETYLENE ELECTRIC

**make *safe* welding easy**

ARMCO IRON Rods are practically pure iron and are peculiarly free from the sulphur, phosphorous, slag, oxides and other impurities that ordinarily destroy the homogeneity of the weld.

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11

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Frogs, Crossings, Switches and Mates
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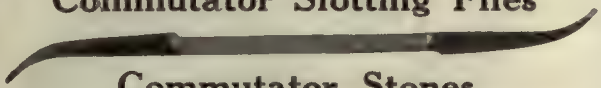

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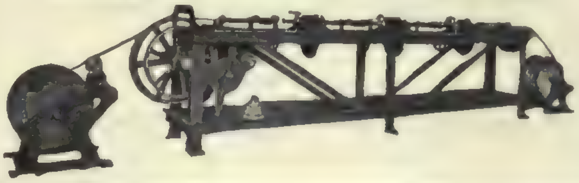

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A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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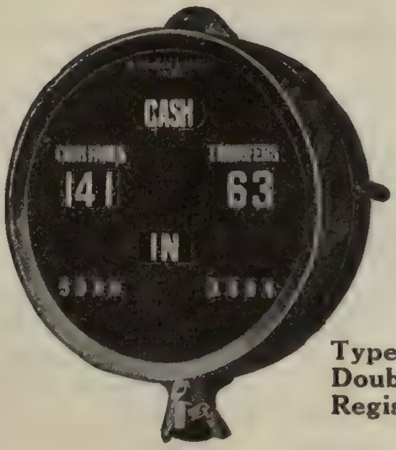

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Commutator Insulators, Tubes, Washers, Rings, Segments, Sheets, Tapes, etc., made of imported mica.

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Linseed oil coated tape, both straight and bias cut for coil winding, cable splicing, bus bars, etc.

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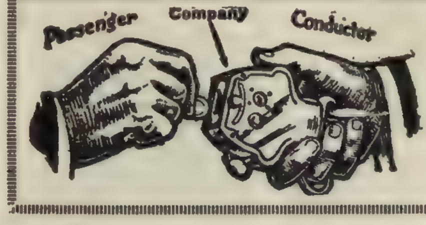

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By the
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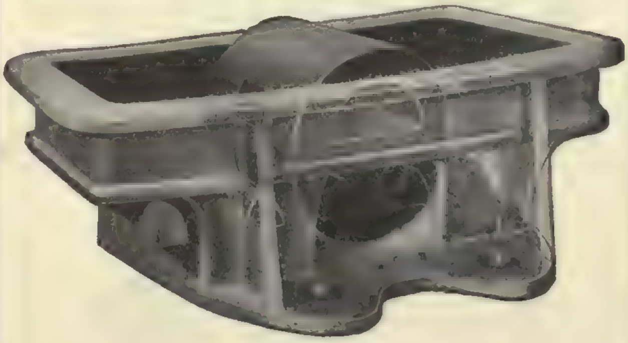

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have neither springs nor axles nor levers nor other delicate parts.

Simply a cage and one roller made of Tropenas steel. Roller is eccentrically loaded.

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That means that they work practically 100% efficient. That is as near perfect as any mechanical device can be made. When your cars are equipped with Smith-Ward Adjusters there are no "ifs" about their operation. They are "safe" all the time. Hundreds of cars equipped with our adjusters now in daily operation are proofs of that statement.

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ELECTRIC HEATERS Cut Installation and Maintenance Charge.
VENTILATORS Also Ventilate in Stormy Weather.
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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.

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Carbon Brushes are uniform. They talk for themselves.

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are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

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"HONEYCOMB" AND "ROUND JET" VENTILATORS
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was the distance covered before this set of brushes was inspected. Even then they were in excellent condition and good for several thousand additional miles. Other brushes delivered 18,000 or less.

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are especially designed for the service in which they are to operate.

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# EMPLOYMENT

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FOREMAN wanted for city car house. 150 cars. Middle West. First-class pay. Eastern man preferred. Address P-431, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

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MASTER mechanic or general foreman. Age, 37; married; will be open for position after June 15; over 18 years with one company; the last three years as master mechanic. Willing to go anywhere. Best references. PW-422 Elec. Ry. Journal.

POSITION as claim agent wanted. Have had 20 years' experience as head of department with present company. Reason for desiring change want larger property and broader field. Can give best references and can deliver the goods. Am 40 years of age and married. PW-429. Elec. Ry. Journal, Philadelphia.

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SUPERINTENDENT wants position; 21 years' experience as dispatcher, chief dispatcher, trainmaster and superintendent of one of the largest interurban railroads in the country; 42 years old; can furnish A-1 references. PW-425, Elec. Ry. Journal, Chicago.

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Wants part time work. Central and Southern states. Complete reports; analyst. EW-432, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

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Advertisers are invited to communicate with Messrs. Fukusho Company, Dairen, Manchuria, who are interested in all kinds of machine tools, engineering requirements and railway materials. If not already represented in Manchuria, Fukusho Company invite correspondence with this end in view. Advertisers are requested to forward catalogues, prices and terms offered.

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With technical training in electrical line by large electrical manufacturer to specialize on electric railway and industrial plant sales. Give age, past experience as well as present salary. AS-433, Elec. Ry. Journal, Philadelphia.

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## GENERATING UNIT

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***Price on application.***

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A large corporation has need for an oil salesman to handle lubricating oils in the steam and electric railway trade.

He should be preferably a graduate engineer, who has had practical experience in locomotive and car shops, or at least has a good knowledge of shop conditions.

He must have had previous selling experience or be able to demonstrate sales ability. State qualifications in detail as to education and experience.

AS418-Electrical Railway Journal
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"Searchlight" advertisements will be printed in Spanish—same as the rest of the paper. No charge for translating copy. Get your copy in *now* for the next *issue.*

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AND MENTION THIS PAPER

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**Bolts, Spikes, etc.**
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**Cable-ways**
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**Air-Compressors**
**Blowers**
**Boilers**
**Condensers**

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**Generators**
**Heaters**
**Motors**
**Pumps**
**Transformers**
**Turbines**
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**Keyseaters**
**Lathes**
**Milling Machines**
**Nut Machines**
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1200 ft. I-R, 2-stage motor drive, with receiver.
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1000 ft. Norwalk, 2-stage steam.
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599 ft. I-R 10-16 x 14, motor drive.
550 ft. Laidlaw-Dunn-Gordon, 12-20 x 18 duplex steam.
489 ft. I-R, 14-16 x 18, steam.
400 ft. Rand Drill, 16-10 x 12, duplex belt.
350 ft. I-R 10-16½ x 10½ steam.
200 ft. Chicago Pneumatic, 10-10 x 10 steam.

## BOILERS
508, 500, 300-hp. B. & W., WT, 160-lb. working pressure.
250-hp. Erie City, 140 lb.
250-hp. B. & W., WT, 160 lb.
150-hp. B. & W., 125 lb.
100-hp. Ames Locomotive, 125-lb. stack.
50-hp. O & S. Locomotive, 100-lb. stack.

## BOLT AND NUT MACHINES
3-in. Acme Bolt Cutter, with 6-spindle nut tap.
1-in. Landis Bolt Cutter, 7 sets chasers.

## BORING MACHINES
5 -in.Barrett type, bar 12 ft., 40-in swing.
5 -in. Beaman & Smith Boring, Drilling, Milling.
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3 -in. Sellers, knee type, 40-in. swing.
2½-in. Bement, knee type, 54-in. swing.

## BORING MILLS
51-in. Bridgeport, 2 heads.
38-in. Baush, 2 heads.
40-in. Brown & Sharpe No. 2, vertical turret
30-in. Niles, also Bridgeport.
2-head Baker, vertical.
No. 5 Moline, 4-spindle.
42-in., 48-in. Gisholt—stand. equip.

## DRILLS—UPRIGHT
42-in , 36-in. Gould & Eberhardt, Blaisdell.
24-in. Fitchburg. Also electric drills.

## DRILLS—RADIAL
5-ft. Prentice, plain taper attachment.
4-ft. Prentice, plain swing arm type.
42-in. Prentice, plain.
2½-ft. Mueller square swing table.

## DRILL PRESSES
1, 2, 3, 4, 5, 6, 8, 9, 12, 16, 18-spindle Natco, Foote-Burt, Henry & Wright; Sipp, Leland & Gifford, Pratt & Whitney, Taylor & Fenn. Sigourney, Dwight-Slate, Prentice, Finn-Sadler, Baush, Avery, Allen, Fairbanks, horizontal and rotary.
23 and 28-in. Rockford.
*State your requirements.*

## ELEVATORS
4000-lb. freight.

## GEAR CUTTERS
54-in. Sellers, auto spur and bevel.
48-in. Hewes & Phillips, spur and bevel.
22-26-in. Bilgram System Bevel Generator, 8-26 in

## GEAR HOBBER
No. 1 Adams, complete, new.

## GRINDERS
Blanchard 20-hp., No. 3 Wilmarth & Norman, No. 60, 70, G, Heald, No. 1 and 2 Morse, No. 2 and 11 B & S, Nos. 2, 3 Union, No. 1 Universal, 14 x 36. Bridgeport, Landis, Walker, Diamond, Cincinnati, No. 2 Oakley, Gisholt, Norton, P & W, Thompson, Van Norman plain, universal, surface, internal, cylindrical.
**All styles and sizes new—state requiremen**

## HAMMERS
6000, 7000, 8000-lb. steam forging.
4500-lb. Bement Forging.
1600-lb. Billings & Spencer, drop.
1100-lb. Erie, drop.
600-lb. Merrell, board lift drop.
500-lb. Miles, steam, 500-lb. Sellers.
100, 125, 150, 200-lb. Beaudry.

**80,000-lb. Riehle Testing Machine**
**8000-lb. steam forging hammer**
**54-in. slotter massive type.**
**36-in. shaper massive type foundry**
**1¼-yd. shovel Marion model 20**
**5-ton EOT crane 3 motors**
**15-ton Brownhoist stdg. 40-55-ft.**
**No. 60 Heald cylinder grinder.**
**No. 2 Cincinnati HP. Miller**
**No. 2 Brown & Sharpe Plain Miller**
**42 in. x 48 in. Gisholt Boring Mill, two heads**

## KEYSEATERS
No 0 Baker Bros., 1 x 9, full equipment, 18-in. compound table

## LATHES
92 x 31½-in. Stoever, triple geared.
42-64-in. x 19-ft. Fitchburg, triple geared.
38-44-in. x 14-ft. Fitchburg.
40-in. x 13-ft. Putnam, triple geared.
26-in. x 18-ft. Bullard, rapid production, 20-hp. motor.
25-in. x 14-ft. Reed, Q.C.
24-in. x 20-ft. New Haven, also 14-in. x 5-ft. and others.
26-in. x 9-ft. Bridgeford.
30-in. x 14-ft. LeBlond, loose gear.
24-in. x 12-ft. New Haven, loose gear.
20-in. x 10-ft. Hamilton, D.B.G., complete.
20-in. x 8½-ft. Lodge & Shipley, Q.C.G.
18-in. x 8-ft. Whitcomb-Blaisdell, Q.C.G.
8 x 60 Lo-Swing.
16-in. x 6-ft.
14-in x 6-ft. Fay & Scott.
11-in. x 5-ft. Prentice.
No. 3 Ames Bench.
No. 3½ Rivett Bench
No 4 Prentiss Bench.

## TURRET LATHES
3½ x 4½-in. National-Acme Gridley, 4-spindle.
3½-in. National-Acme Gridley, single spindle.
20-in. Simplex auto Potter & Johnston.
20-in. Cleveland, 5-spindle, turret chuck.
20-in. x 6-ft. Bullard, friction, B.G.
2 x 24 Jones & Lamson, cone feed.
13, 21, 24, 28, 34-in. Gisholt, 1½, 3½, 5, 6½-in. spindles.
No. 3-A, No. 4 Warner & Swasey, universal, new.
36-in. Bullard, 3-jaw, 5 face, new.
4 3/16-in. Bardons & Oliver.

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No. 4 Smith & Garvin, plain.
No. 2 Lodge & Davis, plain.
No. 2 Hilles & Jones, vertical.
Brainard Slab, table 7 ft. x 20 in.
No. 2 Cincinnati Universal.
No. 2-B Hendey & Norton.
No. 2½ Rockford Universal.
No. 1 Kempsmith, plain, also Universal.
Type A Briggs, Gooley & Edmund.
Nos. 12, 15, 21 Garvin.
No. 8 P. & W., automatic.
Nos. 0, 11, 12 Brown & Sharpe No. 2 vertical.
Nos. 2A, 4B, Vertical, Becker
Nos. 2B, 3B, Milwaukee Plain
Nos. 7, No. 25 Becker.
Nos. 1½ and 6 Pratt & Whitney hand
No. 2 Lincoln. hand.
Newton upright duplex adjustable, with motor.

## PIPE MACHINES
2-in. Merrell Pipe and Nipple Cutter.
6-in. Curtiss & Curtiss Dies, 1½ to 6 in.
6-in. Saunders.
8-in. Merrell Dies, 2½ to 8 in.
8-in. Jarecki Dies, 2½ to 8 in.
12-in. Williams Tool Co., belted.

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60 x 60 x 12-ft. Pond, 3 heads
54 x 54 x 12-ft. Pond, 4 heads
48 x 48 x 16-ft. Powell 4 heads
42 x 42 x 12-ft. H. & P., 2 heads.
34 x 34 x 10-ft. P. & W., 1 head.
32 x 32 x 8-ft. Pond, 2 heads.
32 x 32 x 8-ft. New Haven
30 x 30 x 8 ft. Cincinnati
24 x 24 x 6-ft. Cincinnati

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No. 501-D Ferracute.
No. 666 Toledo 1000-ton.
No. 3 Stiles & Parker.
No. 1 Bliss, 14-in. stroke, straight side.
No. 540 Max Ams, 8-in. stroke.
No. 2 Bliss, 7-in. stroke.
Nos 3, 4, 5 and 6 Farrell.
**And others—state requirements**

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No. 2 H. & J., guillotine bar, 8½-in. knives.
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14-in. throat SE, portable punch, hand or power.
No. 4 Long & Alstater double end Punch and Shear.
No. 13 10-in. Williams & White single end Punch and Shear.

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25-ton saddle tank.
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4—**Motor Head Pattern Makers' Lathes,** Oliver No. 25A, 16 in., with motors.

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Collier, Inc., Barron G.

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Philadelphia Electric Company Supply Dept.

**Air Rectifiers**
Holden & White, Inc.

**Ammeters**
Weston Elec'l Instrument Co.

**Anchors, Guy**
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International Register Co., The

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Vancouver

**And in Principal Cities Throughout the World**

## WHAT AND WHERE TO BUY

**Dogs, Lathe**
Williams & Co., J. H.

**Doors for Bus and Switch Compartments**
Philadelphia Electric Company Supply Dept.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Arnold Co., The
Byllesby & Co., H. M.
Clark Management Corp., E. W.
Drum & Co., A. L.
Ford Bacon & Davis
Holst, Englehardt W.
Republic Engineers, Inc.
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**
Westinghouse Elec. & Mfg. Co.

**Fabricated Steel**
Blaw-Knox Co.

**Fare Boxes**
Brill Co., The J. G.
Cleveland Fare Box Co.
International Register Co., The
Johnson Fare Box Co.
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.
Page Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Electric Service Supplies Co.
Star Brass Works.

**Fibre and Fibre Tubing**
Westinghouse Elec. & Mfg. Co.

**Field Coils. (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.

**Forgings**
Carnegie Steel Co.
Eureka Co.
Standard Forgings Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Furnaces. (See Stokers)**

**Fuses and Fuse Boxes**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**
Columbia M. W. & M. I. Co.
General Electric Co.

**Gaskets**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Carnegie Steel Co.
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Thayer & Co., Inc.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Railway Appliance Co.
Nuttall Co., R. D.
Poole Engineering & Machine Co.
Tool Steel Gear & Pinion Co.
Van Dorn & Dutton Co.

**Gears, Reduction**
Poole Engineering & Machine Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Goggles, Safety**
Standard Optical Co.

**Gongs. (See Bells and Gongs)**

**Graphite**
Morgan Crucible Co.

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.
Indianapolis Frog & Switch Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Grounding Boxes**
Philadelphia Electric Company Supply Dept.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Van Dorn & Dutton Co.

**Hose, Bridges**
Ohio Brass Co.

**Hose, Pneumatic and Fire**
Westinghouse Traction Brake Co.

**Hydraulic Machinery**
Niles-Bement-Pond Co.

**Industrial Construction**
Thompson Starrett Co.

**Inspection**
Electrical Testing Lab's.

**Instrument Cutout Switches**
Philadelphia Electric Company Supply Dept.

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Freyberg Bros., Inc.
Mica Insulator Co.
Standard Paint Co.
Standard Underground Cable Co.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

**Insulation. (See also Paints)**
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Freyberg Bros., Inc.
General Electric Co.
Holden & White, Inc.
Mitchell-Rand Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Insulators. (See also Line Material)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Locke Insulator Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Lackawanna Steel Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

**Joints, Rail**
Carnegie Steel Co.
Lackawanna Steel Co.
Rail Joint Co., The
Reading Specialties Co.
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., J. G.

**Junction Boxes**
Standard Underground Cable Co.

**Laboratory**
Electrical Testing Lab's.

**Lamp Guards and Fixtures**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent. (See also Headlights)**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Ohio Brass Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lathes**
Seneca Falls Mfg. Co.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lighting Regulators, Car**
Holden & White, Inc.

**Lights, Portable Carbide**
Milburn Co., The Alex.

**Lightning Protection**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Locke Insulator Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.
White Electrical Supply Co., T. C.

**Locomotives, Electric**
Brill Co., The J. G.
General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**
Columbia M. W. & M. I. Co.

**Machine Work**
Columbia M. W. & M. I. Co.
Holden & White, Inc.

**Machinery, Insulating**
American Insulating Machine Co.

**Meters, Car, Watt-Hour**
Economy Electric Devices Co.

**Meters (See Instruments)**
Electric Service Supplies Co.
Wood Co., Chas. N.

**Mica**
Mica Insulator Co.

**Mirrors for Motormen**
Drew Elec. & Mfg. Co.

**Motors, Electric**
Westinghouse Elec. & Mfg. Co.

**Nuts and Bolts**
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

**Ohmmeters**
Weston Elec'l Instrument Co.

**Oils. (See Lubricants)**

**Oil Storage Systems**
Gilbert & Barker Mfg. Co.

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)**

**Packing**
Post & Co., E. L.
Power Specialty Co.
Westinghouse Traction Brake Co.

**Paints and Varnishes. (Insulating)**
Mica Insulator Co.
Mitchell-Rand Mfg. Co.
Standard Paint Co.

**Paints and Varnishes for Woodwork**
National Ry. Appliance Co.

**Paints and Varnishes (Preservative)**
Standard Paint Co.

**Paving Bricks, Filler and Stretcher**
Nelsonville Brick Co.

**Paving Material**
Am. Brake Shoe & Fdy. Co.
Nelsonville Brick Co.

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Pipe**
National Tube Co.

**Pipe Fittings**
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

**Planers. (See Machine Tools)**

**Pliers, Insulated**
Electric Service Supplies Co.

**Pole Reinforcing**
Hubbard & Co.

**Pole Sleeves**
Drew Elec. & Mfg. Co.

**Poles, Concrete**
Massey Concrete Products Co.

**Poles and Ties, Treated**
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.

**Poles Metal Street**
Bates Expanded Steel Truss Co.
Electric Ry. Equipment Co.
Hubbard & Co.

**Poles Ties Posts Piling and Lumber**
Carney & Co. B. J.
Lindsley Bros. Co.
Page & Hill Co.
Valentine-Clark Co.
Western Red Cedar Assn.
White Marble Lime Co.

**Poles Trolley**
Columbia M. W. & M I. Co
Electric Service Supplies Co
National Tube Co.
Nuttall Co., R. D.

**Poles, Tubular Steel**
Electric Ry. Equipment Co.
National Tube Co.

**Porcelain Bushings**
Philadelphia Electric Company Supply Dept.

**Post Type Insulators**
Philadelphia Electric Company Supply Dept.

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# WHAT AND WHERE TO BUY

**Power Saving Devices**
Arthur Power-Saving Recording Co.
Economy Electric Devices Co.
Railway Improvement Co.

**Power Transmission Machinery**
Poole Engineering & Machine Co.

**Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Products, Concrete**
Massey Concrete Products Co.

**Protective Devices**
Philadelphia Electric Company Supply Dept.

**Punches, Ticket**
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

**Purifiers, Feed Water**
Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders)**

**Railway Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Rail Welding. (See Brazing and Welding Processes)**

**Rails, Steel**
Carnegie Steel Co.

**Rails, Relaying**
Zelnicker, Walter A., Supply Co., Inc.

**Rattan**
Brill Co. The J. G.
Electric Service Supplies Co.
Hale & Kilburn Corp.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Recorders, Power Saving**
Arthur Power-Saving Recorder Co.

**Registers and Fittings**
Brill Co., The J. G.
Electric Service Supplies Co.
Exell Mfg. Co., The
International Register Co., The
Rooke Automatic Register Co.
Standard Paint Co.

**Reinforcement, Concrete**
American Steel & Wire Co.
Carnegie Steel Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work. (See also Coils)**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Reading Specialties Co.

**Resistance, Grid**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley)**

**Reverse Phase Relays**
Philadelphia Electric Company Supply Dept.

**Rheostats**
General Electric Co.
Mica Insulator Co.
Westinghouse Elec. & Mfg. Co.

**Roofing, Building**
Standard Paint Co.

**Sanders, Track**
Brill Co., The J. G.
Cleveland Fare Box Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car**
Brill Co., The J. G.

**Sash Metal, Car Window**
Hale & Kilburn Corp.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**

**Seats Car. (See also Rattan)**
Brill Co., The J. G.
Hale & Kilburn Corp.
St. Louis Car Co.

**Second-Hand Equipment**
Archer & Balwin
Cleveland Armature Wks.
Duquense Elec. & Mfg. Co.
Electric Equipment Co.
Exell Mfg. Co., The
Foster Co., L. B.
Griswold Machine Co., G. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Shovels**
Hubbard & Co.

**Shovels, Power**
Brill Co., The J. G.

**Signals, Car Starting**
Consolidated Car Heating Co.
Electric Service Supplies Co.
National Pneumatic Co., Inc.

**Signal Systems, Block**
Electric Service Supplies Co.
Federal Signal Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus (See Welding Processes and Apparatus)**

**Speed Transformers**
Poole Engineering & Mach. Co.

**Spikes**
American Steel & Wire Co.
Lackawanna Steel Co.

**Splicing Compounds**
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves. (See Clamps and Connectors)**

**Springs, Car and Truck**
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.

**Sprinklers, Track and Road**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Steel Forms**
Blaw-Knox Co.

**Steps, Car**
American Mason Safety Tread Co.
Universal Safety Tread Co.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Green Engrg. Co.
Westinghouse Elec. & Mfg. Co.

**Storage Batteries. (See Batteries, Storage)**

**Strand**
Roebling's Sons Co., J. A.

**Straps, Car, Sanitary**
Holden & White, Inc.
Railway Improvement Co.

**Structural Iron. (See Bridges)**

**Superheaters**
Babcock & Wilcox Co.
Locomotive Superheater Co.
Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)**

**Switch Stands**
Indianapolis Switch & Frog Co.
Ramapo Iron Works

**Switches, Lock**
Weiss Switch Lock Co.

**Switches, Safety**
V. V. Fittings Co.

**Switches, Track. (See Track Special Work)**

**Switches and Switchboards**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nichols-Lintern Co.
Westinghouse Elec. & Mfg. Co.

**Synchroscopes**
Weston Elec'l Instrument Co.

**Tampers, Tie**
Ingersoll-Rand Co.

**Tanks Ash and Cold Storage**
Green Engineering Co.

**Tanks, Oil Storage**
Gilbert & Barker Mfg. Co.

**Tapes and Cloths. (See Insulating Cloth, Paper and Tape)**

**Telephones and Parts**
Electric Service Supplies Co.

**Terminals, Cable**
Standard Underground Cable Co.

**Testing, Commercial and Electrical**
Elec'l Testing Laboratories

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Railway Utility Co.
Smith Heater Co., Peter

**Thread-Cutting Tools**
Williams & Co., J. H.

**Ticket Choppers and Destroyers**
Electric Service Supplies Co.

**Ties, Mechanical**
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tool Holders**
Williams & Co., J. H.

**Tool Steel**
Carnegie Steel Co.

**Tools, Track and Miscellaneous**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Klein & Sons, Mathias
Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus)**

**Towers and Transmission Structures**
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Blaw-Knox Co.
Westinghouse Elec. & Mfg. Co.

**Tower Wagons & Auto Trucks**
McCardell & Co., J. R.

**Track, Special Work**
Barbour-Stockwell Co.
Cleveland Frog & Crossing Co.
Columbia M. W. & M. I. Co.
Indianapolis Switch & Frog Co.
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.

**Transfers. (See Tickets)**
Archbold-Brady Co.

**Transformers**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stair, Car Step**
American Mason Safety Tread Co.
Universal Safety Tread Co.

**Trolley Bases**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Holden & White, Inc.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Bases, Retrieving**
Holden & White, Inc.

**Trolleys and Trolley Systems**
Ford Chain Block & Mfg. Co.

**Trolley Shoes**
Holden & White, Inc.
Miller Trolley Shoe Co.

**Trolley Wheels. (See Wheels, Trolley)**

**Trolley Wire**
American Steel & Wire Co.
Roebling's Sons Co., John A.
Rome Wire Co.

**Trucks, Car**
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Tubing, Steel**
National Tube Co.

**Turbines, Steam**
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Elec. & Mfg. Co.

**Turnstiles**
Percy Mfg. Co., Inc.

**Valves**
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Varnishes. (See Paints, etc.)**

**Ventilators, Car**
Brill Co., The J. G.
Holden & White, Inc.
National Railway Appliance Co.
Railway Utility Co.
St. Louis Car Co.

**Vises, Pipe**
Williams & Co., J. H.

**Voltmeters. (See Instruments)**

**Water Softening and Purifying Systems**
Scaife & Sons Co., Wm. B.

**Wattmeters**
Weston Elec'l Instrument Co.

**Welded Rail Joints**
Indianapolis Switch & Frog Co.
Lincoln Bonding Co.

**Welding Processes and Apparatus**
Electric Railway Improvement Co.
General Electric Co.
Indianapolis Switch & Frog Co.
Lincoln Bonding Co.
Metal & Thermit Corp.
National Ry. Appliance Co.
Westinghouse Elec. & Mfg. Co.

**Welders, Portable Electric**
Electric Railway Improvement Co.
Indianapolis Frog & Switch Co.
Lincoln Bonding Co.

**Wheel Guards. (See Fenders and Wheel Guards)**

**Wheel Presses. (See Machine Tools)**

**Wheels, Car, Cast Iron**
Bemis Car Truck Co.
Griffin Wheel Co.

**Wheels, Car, Steel and Steel Tired**
Bemis Car Truck Co.
Carnegie Steel Co.
Standard Steel Works Co.

**Wheels, Trolley**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

**Whistles, Air**
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Wire Rope**
American Steel & Wire Co.
Roebling's Sons Co., John A.

**Wires and Cables**
Aluminum Co. of America
American Elec'l Works
American Steel & Wire Co.
Bridgeport Brass Co.
D & W Fuse Co.
General Electric Co.
Roebling's Sons Co., John A.
Rome Wire Co.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

**Wrenches**
Williams & Co., J. H.

**Wood Preservatives**
Lindsley Bros. Co.
Valentine-Clark Co.

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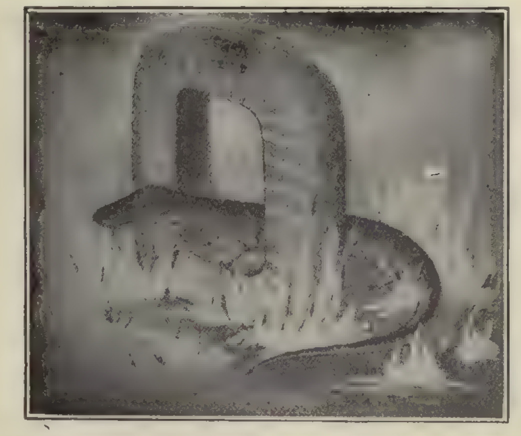

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Special Agents for Tool Steel Gear & Pinion Co., Johnson Fare Box Co. C. & C. Electric & Mfg. Co., Holden & White, Inc. General Agents for Anglo-American Varnish Co. Eastern Agents for Union Fibre Co.

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They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

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**Hemingray Glass Company**
**Covington, Ky.**
Factories: Muncie, Ind. Est. 1848—Inc. 1870

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"Trade Mark Reg. U. S. Pat. Off."

**Samson Spot Waterproof Trolley Cord**

Made of fine cotton yarn braided hard and smooth. Inspected and guaranteed free from flaws. Proved to be the most durable and economical. Samples and information gladly sent.

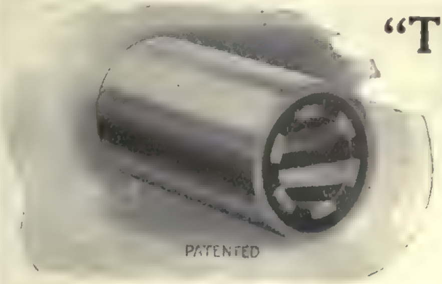
1 SAMSON CORDAGE WORKS, BOSTON, MASS.

UNIVERSAL ANTI-SLIP TREADS

cars and station steps.

**Universal Safety Tread Company**

Waltham, Mass.



"The New Haven"

Trolley Wheel Bushing

*Perfect Lubrication*

*No Oil Required*

Made from special bearing metal, machine rifled, eliminating all sand, scale or grit. Grooves, running entire length, are filled under heavy pressure with a hard lubricating compound, making a smooth-running, perfectly lubricated bearing without the use of oil. Catalogue mailed upon application.

**The H. B. Ives Company, New Haven, Conn., U. S. A.**

The "Hycap-Exide" Battery

for

STORAGE BATTERY STREET CARS

THE ELECTRIC STORAGE BATTERY CO

PHILADELPHIA

MASON SAFETY TREAD—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits

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Over six million feet used without accident being reported within the knowledge of manufacturer.

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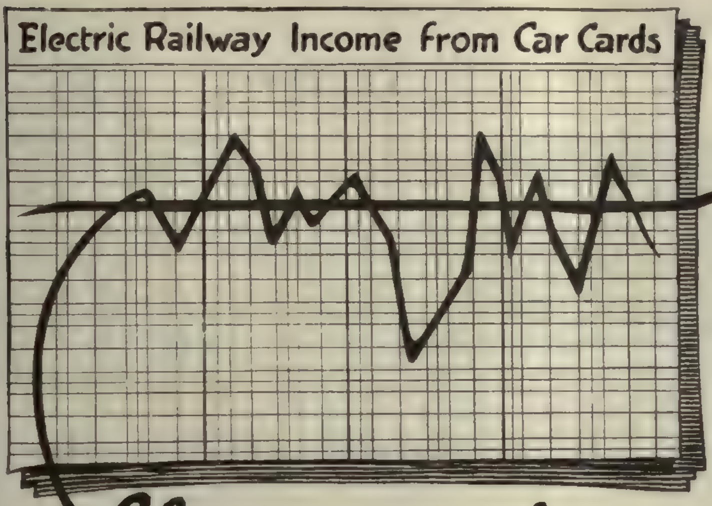
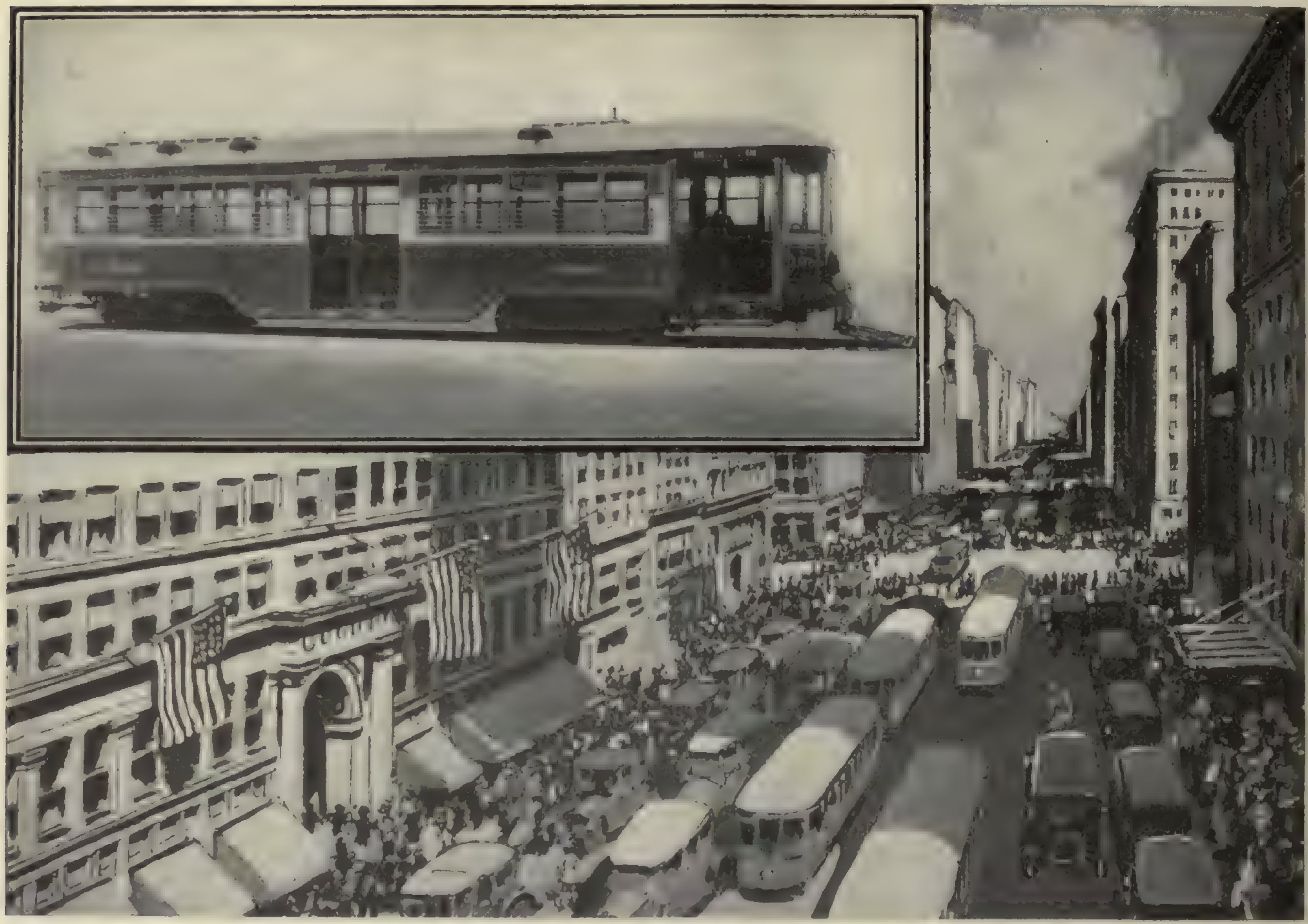

Electric Railway Income from Car Cards

A Continuing Stabilized Income uninfluenced by Fluctuating Business Conditions

When you sign a Collier contract you are relieved of all worry regarding economic ups and downs and their influence on the income from your car card space.

Collier Service assumes the responsibility of protecting such space against depreciation, not only on the big roads but on the smallest lines all over the country. None but a nation-wide organization can render this service and so secure a definite, stabilized income to the electric railways.

Barron G. Collier INCORPORATED
**Candler Building**
**220 West 42nd Street, New York City**



# Christmas is Coming!

DURING the midsummer months, when a large part of the population of every city is away on vacation and no one goes into the business district who doesn't have to, the traffic figures drop to the low mark of the year.

But if traffic is easing up now, it won't be long before it comes back again with renewed and even greater demands.

In three months summer will be over and the busy fall months will come with Christmas looming large in the perspective of most of the population. Newspapers will herald Christmas goods and stimulate Christmas shopping. Crowds will be added to crowds.

If your lines are congested now and if you are planning to stop the congestion and be in shape to handle the fall and Christmas traffic, now is the time to place your order for cars.

Doubtless you have investigated the advantages of operating with the Front-entrance, Center-exit, Conductor-at-center Car and are interested in the thoroughly proved means of increasing to its utmost the car-mile capacity of heavy traffic lines which is provided by this type—

## The Peter Witt Car

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR COMPANY
ST. LOUIS, MO.

BRILL

G. C. KUHLMAN CAR COMPANY
CLEVELAND, OHIO

WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

"Hello, Jones, welcome home! You see our city has acquired Birney Safety Cars since you left."

"Yes, and it's a real acquisition! My trip took me to a good many places where these cars are used and I want to tell you that every one of those cities was prosperous and progressive and had a good reputation with the traveling men I met. I believe that good transportation has a lot to do with prosperity."

HOW many more calls would business men make if they knew they could get cars when they wanted them?

How many more shopping trips would women make if they hadn't recollections of long waits for cars?

How many more walkers and automobile users would be railway passengers if they hadn't been irritated by a series of car-waiting experiences?

How many more people would go to ball games, parks, movies and other amusements if they were fairly sure their enjoyment wouldn't be marred by standing and waiting for cars?

Frequent and quick car service is the biggest kind of an incentive to increased activity of the entire population of a city.

More business is done. More money is circulated. Everything speeds up and takes on a healthier tone.

The Birney Safety Car gives exactly the service that every city needs.

BIRNEY
TRADE MARK
SAFETY
CAR

*Birney Safety Car Service produces the good-will that puts a railway company in the best position to obtain a higher rate of fare.*

THE J. G. BRILL COMPANY
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ST. LOUIS, MO.
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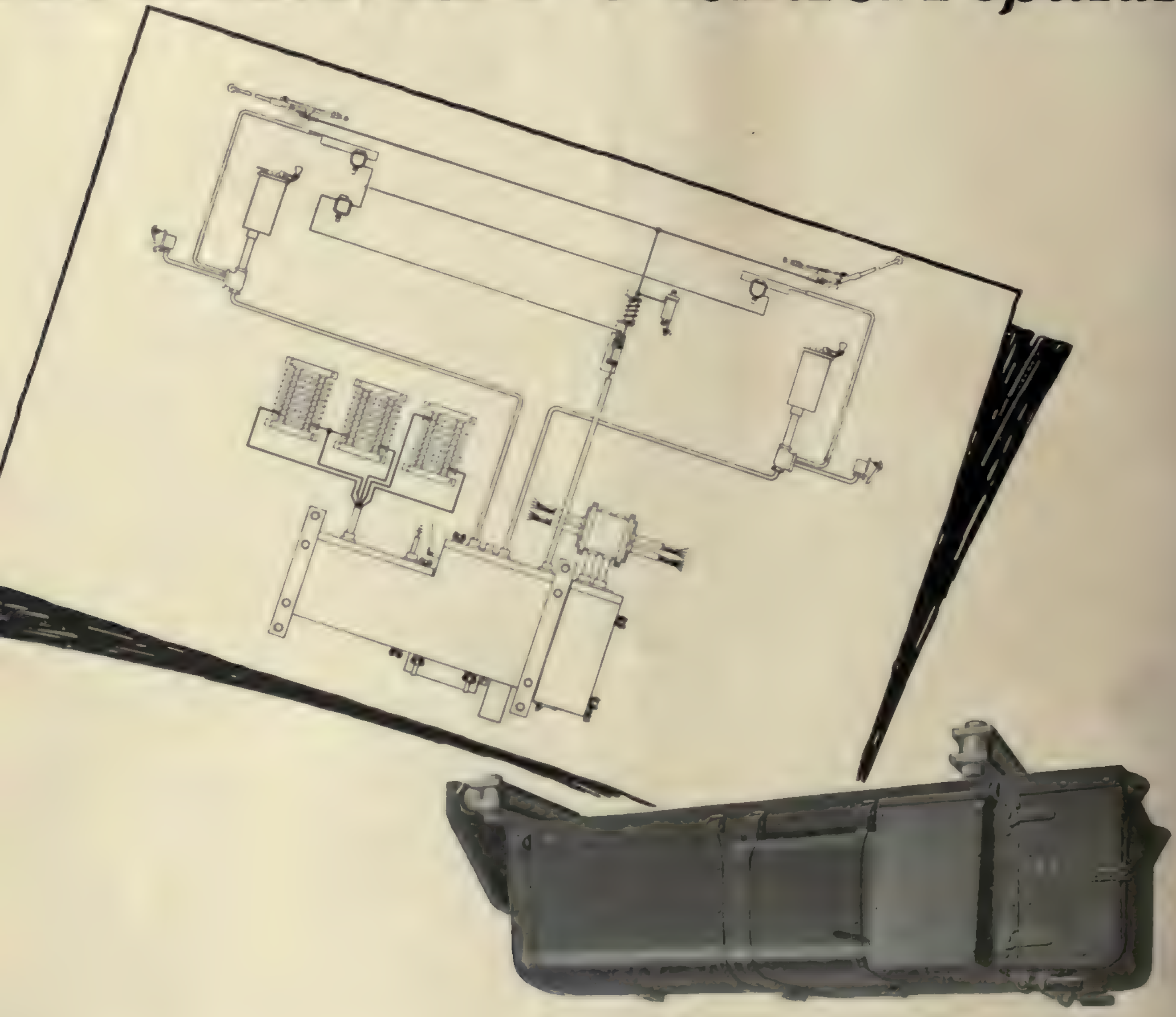
BRILL

# *Simplicity*
# *One reason for P C Control Popularity*



Inspect this wiring diagram—*note* the simplicity.

That is the complete diagram of the now famous Sprague-General Electric Type PC for remote control.

PC Automatic Control can be set to accelerate, notch by notch, at the rate best suited to traffic, motors and comfort of passengers.

GENERAL ELECTRIC COMPANY

General Office, Schenectady, N.Y. Sales Offices in all large cities

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# ELECTRIC RAILWAY JOURNAL

*Focusing on an Individual Advertiser the Benefit of a Nation-wide Organization*

Come where men of sincere good-will can lend you an expert hand in business.
SECOND NATIONAL BANK
2

Barron G. Collier
INCORPORATED
CANDLER BUILDING
220 West 42nd Street – New York City

# Westinghouse

## Progressive Spirit

"JOE," said the General Manager to the Superintendent, "have you read that rainbow ad. on the Nuttall Helical Gear in the Electric Railway Journal?"

"Indeed I have, Boss," answered Joe, "and I am curious and anxious to learn more about it, too."

"So am I, Joe," said the General Manager, "and the claims they make interest me greatly. I'll write to the R. D. Nuttall Company immediately, as we surely want to get all the facts, and if they can convince us that Nuttall Helical Gearing will eliminate vibration and noise, we will want that type of gear for our new order of Westinghouse No. 506 Motors; we must analyze this question at once, so we can give these gears a try-out on the new motors we have ordered, if it is not too late to change."

# Nuttall Gears

EVERY GEAR REGISTERED

**Westinghouse Electric & Mfg. Co.**
**East Pittsburgh, Pa.**

**R. D. Nuttall Company**
**Pittsburgh, Pa.**

**THIS ISSUE CONTAINS THE INDEX FOR VOL. 53**

*Vol. 53, No. 26* New York, June 28, 1919 *Pages* 1255 *to* 1300

# Electric Railway Journal

H. W. BLAKE, *Editor*

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### The Zone Fare in Practice in Reading, England

More than 180 rides per passenger per annum in a community of 88,000. Walter Jackson describes the combination of penny short rides and 1½-penny rides from center to end of line, with second collection if ride is across town ........................................................ Page 1258

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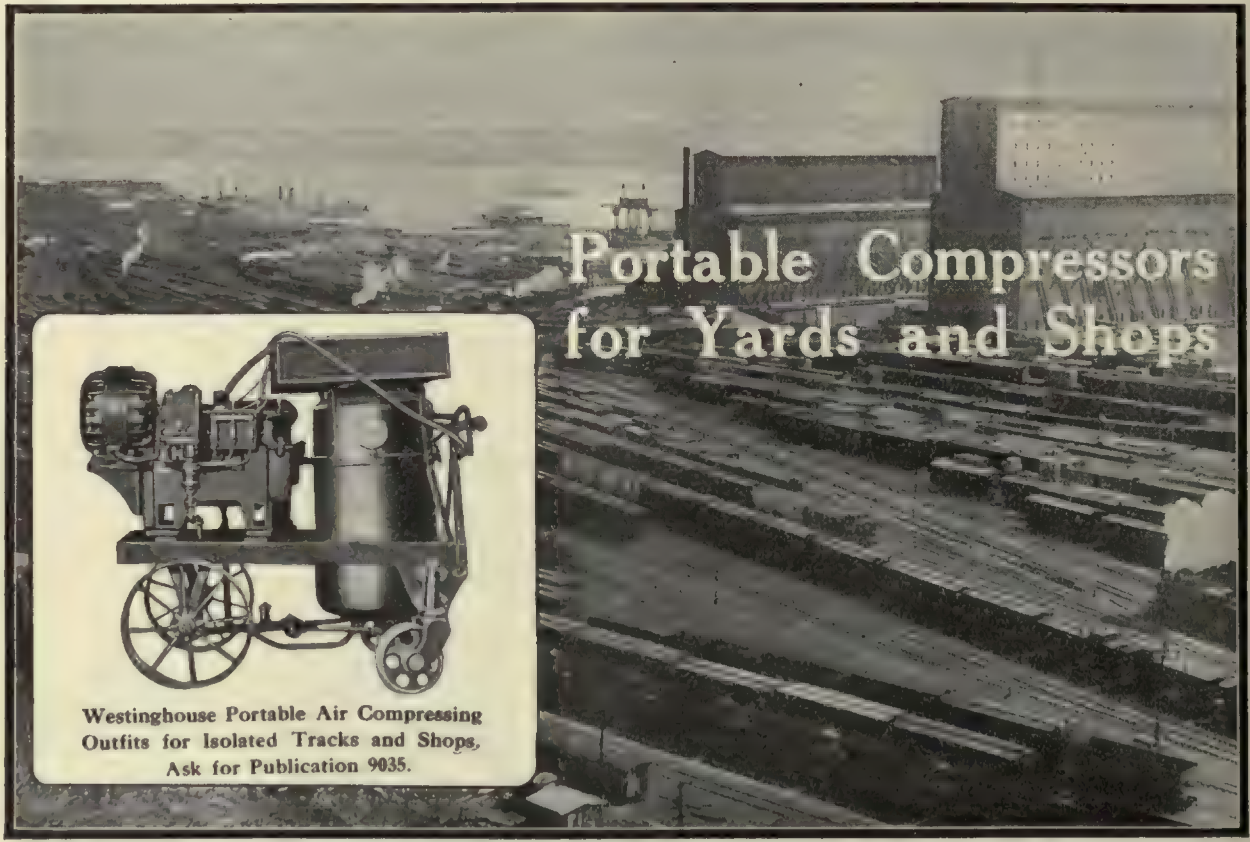

Westinghouse Portable Air Compressing Outfits for Isolated Tracks and Shops, Ask for Publication 9035.

Isolated yard tracks and smaller shops are often denied compressed air because they are located remote from the central plant.

**Westinghouse Portable Air Compressing Outfits,**

which can be wheeled anywhere at will and be plugged in on any light or power circuit, will supply compressed air for all such purposes.

*Brake Building our Business for a Lifetime.*

**Westinghouse Traction Brake Company**

General Offices and Works, Wilmerding, Pa.

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Denver, Col.
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Los Angeles, Cal.
Mexico City
New York, N. Y.
Pittsburgh, Pa.
San Francisco
Seattle, Wash.
St. Louis, Mo.
St. Paul, Minn.

# The Significance Of Repeat Orders-

## —Alabama Power Company Warrior Steam Plant

Buying for our personal needs teaches us the significance of repeat orders. The principle holds good in big business, and when the manufacturer comes back with a second order, it is an indication that the first has been satisfactory.

In March, 1916, the ALABAMA POWER COMPANY placed their first order for five Westinghouse Underfeed Stokers for boilers totaling 6000 rated hp. The performance of these stokers was carefully checked and a year later a second order for two Underfeeds for boilers totaling 2400 hp. was received. This was followed by an order for eleven Underfeeds for boilers totaling 13,200 hp. In August, 1918, seven months later, the ALABAMA POWER COMPANY placed an additional order for two Underfeeds for boilers totaling 1200 hp.

Listed below are a few of the larger companies who have repeatedly come back for additional Westinghouse Underfeed Stoker Equipment.

Let us mail you a copy of Circular describing those features which give the Westinghouse Underfeed its high combustion efficiency.

Westinghouse Electric & Manufacturing Company,
East Pittsburgh, Pa.

*H. M. Byllesby & Co.*
Minneapolis, Minn.
St. Paul, Minn.
Louisville, Ky.
Mobile, Ala.
Canon City, Colo.
Ottumwa, Iowa
Sioux City, Minn.
Galena, Ill.

*Dupont Engineering Co.*
Wilmington, Del.
Barksdale, Wis.
Carneys Point, N. J.
Philadelphia, Pa.
Williamsburg, Va.
Hermitage, Tenn.
Racine, Wis.
Detroit, Mich.

*J. G. White Engineering Corporation*
Muscle Shoals, Ala.
Sheffield, Ala.
Hampton, Va.
North Adams, Mass.

*United Gas & Electric Engineering Corp.*
Lockport, N. Y.
New Orleans, La.
Little Rock, Ark.
Elmira, N. Y.

*Alabama Power Co.*
Benoit, Ala.
Birmingham, Ala.
Gadsden, Ala.

WESTINGHOUSE ELECTRIC

# Westinghouse

## "Oh, Kid! Ain't This Great?"

*"Windows and sash down at side, front and rear.*
*"Every one of us facing the breeze.*
*"In a seat built for just us two.*
*"With nobody to stand on our toes.*
*"Say, it's just like riding in a Private Car.*
*"It's even more pleasant and a lot safer than the old-time high step open car."*

# The Safety Car Is a Safety Car All the Time

## But No Car Is a Safety Car Any of the Time Unless Equipped with

automatic, laborless apparatus, so interlocked that regardless of the illness or distraction of the operator, the power will be cut off instantaneously, the air brakes and sander apply immediately thereafter and the doors unlatch for safe and easy exit. Furthermore, it is a Safety Car only when the doors must be closed and the step folded before the car can start, and when the air brake must be applied before the doors are opened and the step lowered in bringing the car to a service stop.

## SAFETY CAR DEVICES CO.

**Main Office—Boatmen's Bank Bldg., ST. LOUIS, MO.**

CHICAGO
Railway Exchange Building

NEW YORK
City Invest. Building

PITTSBURGH
Westinghouse Building

CANADA—Canadian Westinghouse Co., Ltd., Hamilton, Ont.

# INTERNATIONAL
## STEEL TWIN TIES

**Provide permanent track at a lower cost than any other type of construction.**

Only eight hundred cubic yards of excavation and seven hundred and ninety cubic yards of concrete per mile of Twin Tie track. One-half of the yardage necessary with wooden ties.

This saving in labor and material multiplied by unit costs equals savings between $5,000.00 and $7,000.00 per mile of track.

Prompt deliveries can be made from stock.

*The photograph shows the concreting operation on Steel Twin Tie Track on the Lake Shore Electric Railway at Lorain, Ohio.*

## The International Steel Tie Company

**Manufacturers of Steel Twin Ties and Crossing Foundations**

**General Sales Office and Works: Cleveland, Ohio**

OB PRODUCTS
*Quality First*

Seattle one man cars equipped with O-B Trolley Catcher and Crouse-Hinds Imperial Headlight.

Experiment and Experience

Seattle bought the new one man cars largely as an experiment —the experiment has been successful.

But Seattle specified O-B Trolley Catchers and Imperial Headlights from experience.

A large proportion of the money-saving, good-will making, light-weight cars—like so many of their bigger brothers—carry O-B Trolley Catchers and Imperial Headlights.

**The Ohio Brass Company, Mansfield, Ohio**
New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco
*Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.*

# PRODUCTS

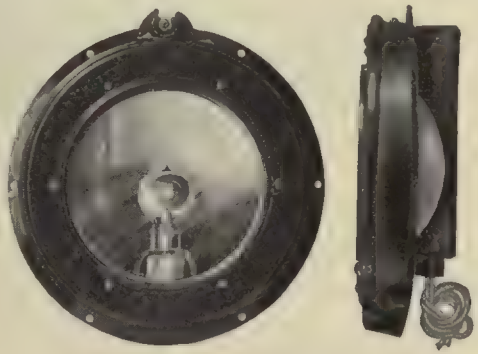
*Quality First*

# A Favorite Light-Weight Headlight For a Famous Light-Weight Car

With a focusing adapter and a concentrated filament lamp, the Type ZP Headlight provides plenty of light for safe operation through city, suburbs and country.

The adapter screws in a regular socket, and may be replaced by an ordinary pear shaped lamp at any time.

Plenty of illumination and sturdy, trouble-proof, light-weight construction make the Type ZP one of the favorite Crouse-Hinds Imperial Headlights for the one man cars.



**Front View** **Side View**

**Type ZP Headlight with concentrated filament lamp. Net weight 8 pounds.**

## O-B Trolley Catcher Takes Care of the Trolley

When the trolley pole jumps the O-B Catcher stops it—and that's the end of it. A unique O-B feature prevents the pole from stepping-up due to the rebound.

It doesn't take the motorman of a one man car long to discover that he can give all his attention to the front end and let the O-B Catcher take care of the trolley.

## The Ohio Brass Company, Mansfield, Ohio

**New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco**

***Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.***

# HERE IT IS!!

# The New Street Car Heater

The New Jewel Hot Blast Forced Ventilation heater for Electric Railway cars includes some of the most attractive features ever combined in a car heating plant.

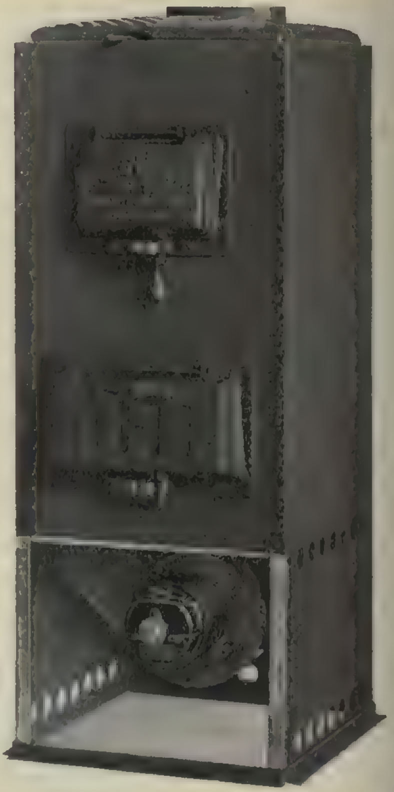
It is produced for us by The Detroit Stove Works, one of the oldest and largest stove makers in America. Compared with other heaters it is lighter, has fewer parts, is cheaper to maintain and operate, delivers hotter air in greater volume and burns any kind of fuel.

Air is taken from the car roof and is thus clean and fresh. The Jewel hot blast prolongs the life of the fire, causes total combustion of gases and utilizes all possible heat units.

It has the best accessory apparatus obtainable such as

Westinghouse Motor and Resistance
Sturtevant Blower
Garland Smoke Jack
H. & H. Snap Switch

Deliveries are now being made.



*Heater with motor door removed*

Made in sizes suitable for

Safety Cars
Large City Cars
Interurban Cars

## COMING!!

### A New Electric Heater

Within the month of June we will announce a new and unique type of electric heater for street cars. The heating element is produced for us by the Cutler-Hammer Manufacturing Company. It is lighter, simpler, more durable than any electric car heater ever designed.

*Complete Description, Prices, Etc., on Application*

**Holden & White Inc.**

817 Fisher Building, CHICAGO
2213 Dime Bank Bldg., DETROIT

# *Practically Every Birney Safety Car is Keystone Equipped*

The general adoption of Keystone Specialties on the famous Birney Safety Car furnishes a testimonial of inestimable value to all interested in this equipment. As is generally known, this type of car was designed with extraordinary knowledge of the requirements of present operating conditions. You'll find the following Keystone equipment on practically every Birney Safety Car:

**"Golden Glow" Incandescent Headlights**
**Illuminated Car Destination Signs**
**Faraday High Voltage Car Signals**
**Keystone Trolley Catchers**
**Keystone Air Sanders**
**Keystone Rotary Gongs**

Surely this great triumph for Keystone Material is a message to you. If you are using this equipment you may feel complimented on your wise selection. If you are about to buy it there should be no hesitancy with this present triumph in view.

***Thousands of Other Cars Are Keystone Equipped***

## ELECTRIC SERVICE SUPPLIES CO.

***Manufacturer of Railway Material and Electrical Supplies***

**PHILADELPHIA**
**17th and Cambria Streets**

**NEW YORK**
**50 Church St.**

**CHICAGO**
**Monadnock Building**

# Phono-Electric belongs at All Busy Centers

Seattle uses No. 00 round Phono-Electric Trolley Wire at many curves, both in the heavy and normal traffic lines.

The one pictured is at Fourth Avenue and Main Street, where it has insured continuous energy supply

**to 500 cars a day since February, 1911**

Not only is the Phono-Electric wire still up —it has never been down!

## Bridgeport Brass Company

Bridgeport Connecticut

2063

**through winter snows and summer heat**

For nine years this **ARMCO IRON** Culvert has been exposed to the weather. Yet it shows not the slightest sign of deterioration.

The permanence of **ARMCO** Culverts of pure iron finds convincing proof in such installations as this.

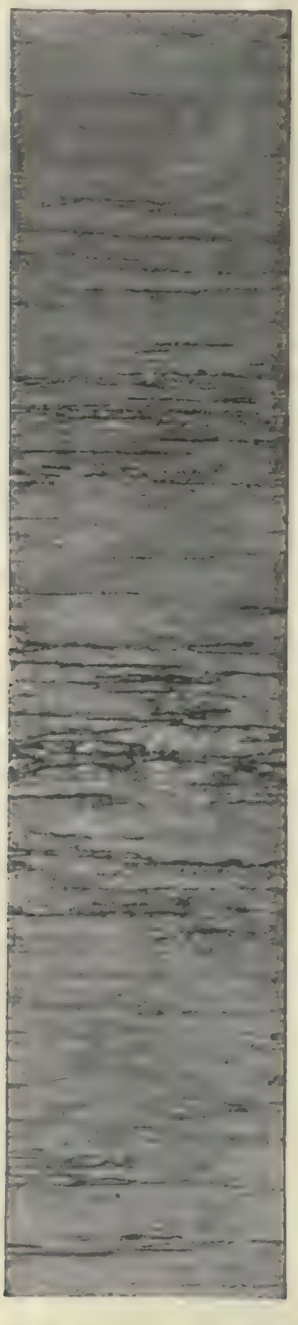
There is a manufacturer in nearly every State, and in Canada, making genuine rust-resisting ARMCO IRON Culverts and other products of ARMCO IRON, such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

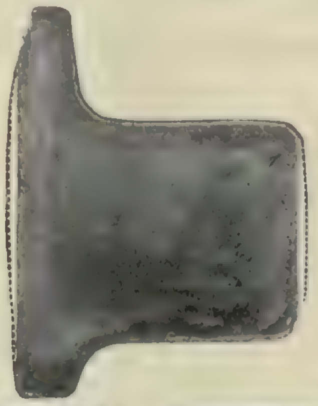
**ARMCO IRON CULVERT & FLUME MFRS. ASSN.**
TRANSPORTATION BLDG.
CHICAGO

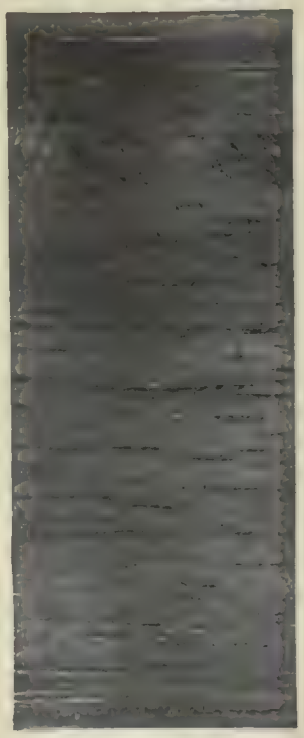
AMERICAN
ARMCO
INGOT IRON

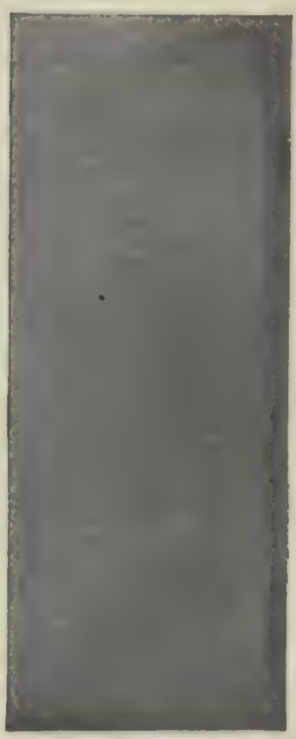
# Does the Lackawanna Deseaming Proces Really Improve Rail Quality?—Here Is Some Good Evidence That It *Does.**

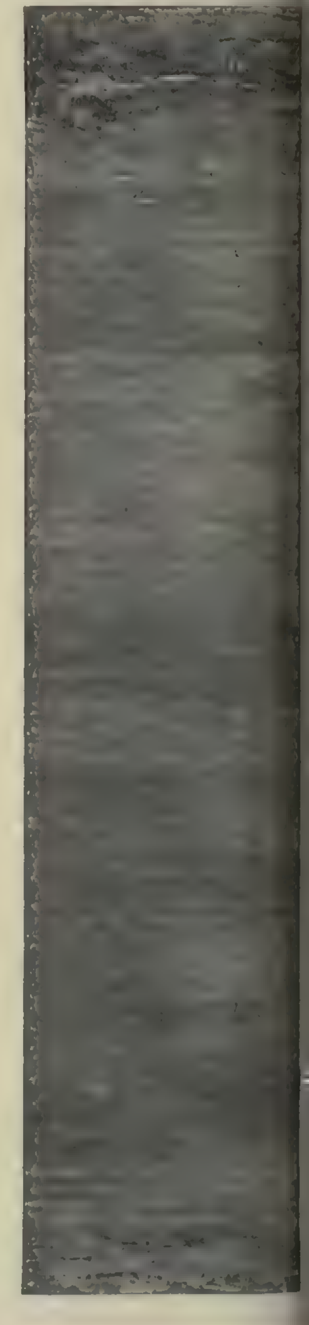
These pictures of etched surfaces of a partially rolled rail bar at the location of the rail head and rail base indicate clearly the condition of the rail bar just before and just after application of the Lackawanna Deseaming operation. This removal of the defective surface comes at a period in the rolling process when the hot rail bar is approximately 75 per cent finished—that is, after the ingot has been bloomed down to an 8-inch by 8-inch cross section by the blooming rolls, after the end has been cropped and the bloom further reduced by five, more or less, passes on what is known as the roughing or shaping stand of rolls. A machined, polished and etched end section of a bar at this stage of the rolling operation would clearly show the well-











At the top, center, cross section of 75 per cent finished rail bar, immediately after passing through the saw, and indicating by the dotted lines the amount of metal removed by the Lackawanna Deseaming Process.

At the left, full sized section base and head of the bar etched to show the surface seams that exist before milling off the surface metal.

At the right, head and base of the same bar, immediately after treated by the Lackawanna process. Etched to show the improved condition of the surface metal.

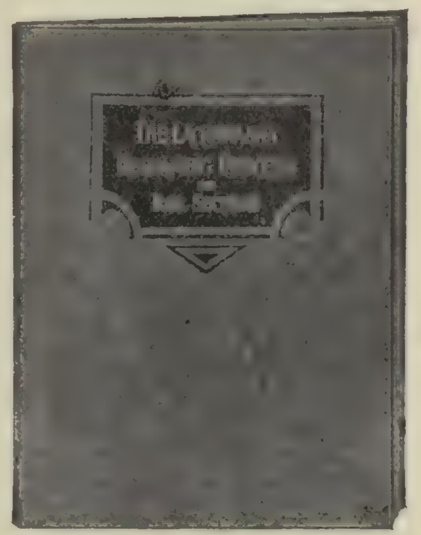
**** One of a series of talks on Better Rails. Follow them.***

defined envelope of weak and partially decarburized metal, 3/32 inch to 5/32 inch in depth. The small end section herewith does show this weak metal faintly at the surfaces not touched by the Lackawanna deseaming miller. If allowed to remain, this inferior metal does not lose its identity during the rolling operation, even to the finished product. The portions of the head and base of the same cobble etched to show the appearance of the seams and laminations tell the story. At this stage in the rolling operation, a rail bar containing four 33-foot rails is about 60 feet in length, and the area of metal which it is desirable to remove is 7 inches in width at the base of the bar, 4 inches in width on the top of the bar, and in both places about ⅛ inch in depth.

The improvement in the head and base metal just after passing through the deseaming saws, as shown in the right-hand corner, is typical of the condition of the whole length of the bar. Five or more subsequent rolling operations then further reduce the bar to the finished section, thereby completing the important finishing operations on clean, dense, hard metal of the highest strength.

This assures a rail head far better able to withstand abrasion and sloughing under constant heavy traffic and heavy wheel loads, and a rail base without any fissures or weakness that can spread under the heaviest of transverse stresses.

If the many economies of better rail service interest you, tell us what rail sections and wheel loads you have and our engineers will advise you in detail what you can gain by using Lackawanna Deseamed Rails.

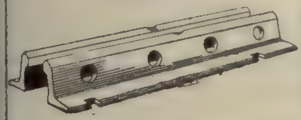


**Write for this book. Its pages are filled with good information on rail problems.**

# All Lackawanna Rails Are Deseamed

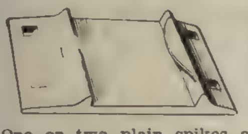
## Other Lackawanna Aids to Better Track

### The Lackawanna Safety-Head Angle Bar



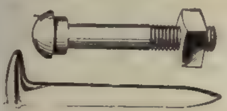
overcomes liability to wear and fracture by preventing cutting of the bar at the top from back action or upward thrust of the rail ends. This is accomplished by a slight depression in the head of the angle bar for a short space at the center where the rail ends meet.

### The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

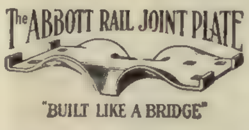
Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.



### Lackawanna Track Bolts and Spikes

Our track bolts and spikes of all standard sizes for light or heavy rails, enjoy an enviable reputation for careful, accurate workmanship and finish.

### The Abbott Rail-Joint Plate



strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects the rail ends from battering and breaking down.

The hard steel and combination of reversed flanging within the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in type especially suitable for ordinary steam railway service, for use in paved streets and for welding to the rail base, and may be held with either screw or ordinary spikes.

**Write for our booklet**

**"Improved Track Appliances"**

# Lackawanna Steel Company

**General Sales Office and Works: Lackawanna, N. Y.**

**Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco**

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York

**7.** **"When the weld is cooled the mold may be removed!"**

"The longer the mold is allowed to cool, the better. The metal in the weld then has time to become properly annealed.

"Do you understand, gentlemen? Do you see the advantage of the Thermit Weld? Instead of joints that are potential sources of trouble and expense, to say nothing of wear and worry, you have two continuous bands of steel.

"As for the risers and metal left in the pouring gates, they are easily cut off by nicking with a hammer and chisel. Simply knock them off.

"Now we will flash the finishing touch—grinding the weld flush with the rail."

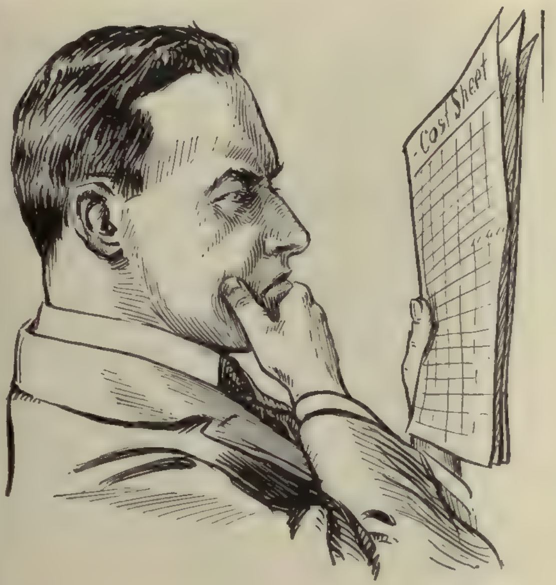
**See these movies on your office wall!**

*We are ready to send a man to project these pictures. The film shows every detail. The pictures illustrating this advertisement were taken from this film. This "movie" will SHOW you how Thermit Welds can be made successfully by your own men.*

**Metal & Thermit Corp.**
**120 Broadway, New York**

BRANCHES
329-333 Folsom St., San Francisco. 15 Emily St., Toronto, Ont. 7300 So. Chicago Ave., Chicago. 1427-1429 Western Ave., Pittsburgh, Pa.

Factories located at Chrome, N. J.; Wyandotte, Mich.; East Chicago, Ind.; Jersey City, N. J.



# Don't Despair

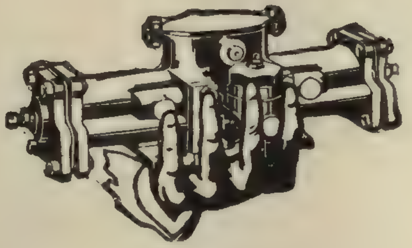
## More people are taking more rides than ever

If you aren't doing bigger business there must be a reason.

Ten to one that reason is so long an interval between cars that people use other means of transport or walk.

You say you can't afford to give the service that would get the business, or buy new one-man cars?

The answer is easy: Equip your present cars with *National Pneumatic Door and Step Control* for one-man service and thereafter you can give a service that will capture all the traffic in sight and

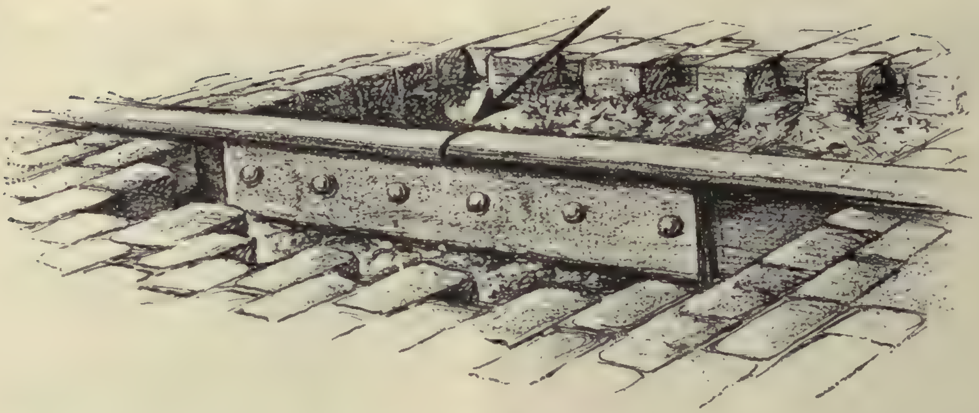


**Make More Money for Your Men and Yourself**

# NATIONAL PNEUMATIC COMPANY
INC.

50 Church St., New York
Edison Bldg., Chicago, Ill.

Works: Rahway, N. J.



*A Little Grinding Here Will Conserve the Rail, the Joint and the Paving*

Just this small difference in the height of rails at the joints can cause all the trouble—and expense.

This difference must be removed immediately after laying the rails. The one *best* way is with the

**Reciprocating Track Grinder**

—the only machine that answers the demands of every condition and does it cheaply, efficiently and thoroughly. How foolish to neglect your track—to allow rails to become corrugated and joints cupped until there is nothing to be done except replace both rail and joint.

Start with the new track. Keep joints planed and grind out corrugations as they appear. Your track will last from 15 to 40 per cent. longer, wear and tear on rolling stock will be lessened and at the same time you will save money on repairs that would otherwise be necessary.

***Let us show you on your own track without cost or obligation to you.***

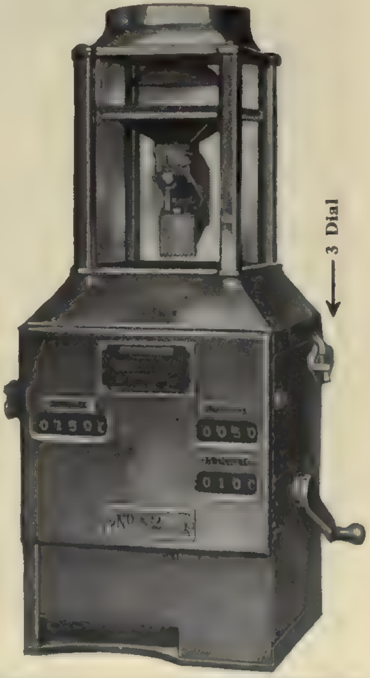
**Railway Track-work Co.**

**30th and Walnut Sts., Philadelphia**

# JOHNSON "Double Check" System —Safe for Revenue

The "One-Man" Safety Cars at Terre Haute, Ind., are equipped with Johnson Registering Fare Boxes and the "Double-Check" System. In commenting on their effectiveness in solving the fare collection problem the General Manager of the Terre Haute, Indiana and Eastern Traction Co. expressed this idea:

> *We not only think we are getting all fares due us—We know it—because we are using the "Double-Check" system—the registering fare box in connection with the ordinary fare register and metal tickets.*



The Johnson Fare Box has won the position of "The Leader" through its ability to stand up in service in registering pennies, nickels and dimes and metal tickets. When backed up by an overhead register on which to register all passengers carried, you get a double check on fares earned; which is profit insurance. When this Johnson Fare Box double check system and Johnson Metal Tickets are installed all weak points—the sources of fare manipulation—are eliminated.

*There's a Johnson method for your conditions. Ask us about it.*

**Johnson Fare Box Company**
**Jackson Boulevard and Robey St., Chicago**
**50 East 42nd Street, New York**

# “Indianapolis” Manganese

Has Proven Efficient and Economical for over 100 Roads
Who have Installed Over $1,000,000 Worth.

This Record Should Merit Your Inquiry.

Our Establishment and Facilities Enable Us to Name
ATTRACTIVE FIGURES and SATISFACTORY DELIVERIES
Write Us and Save Money.

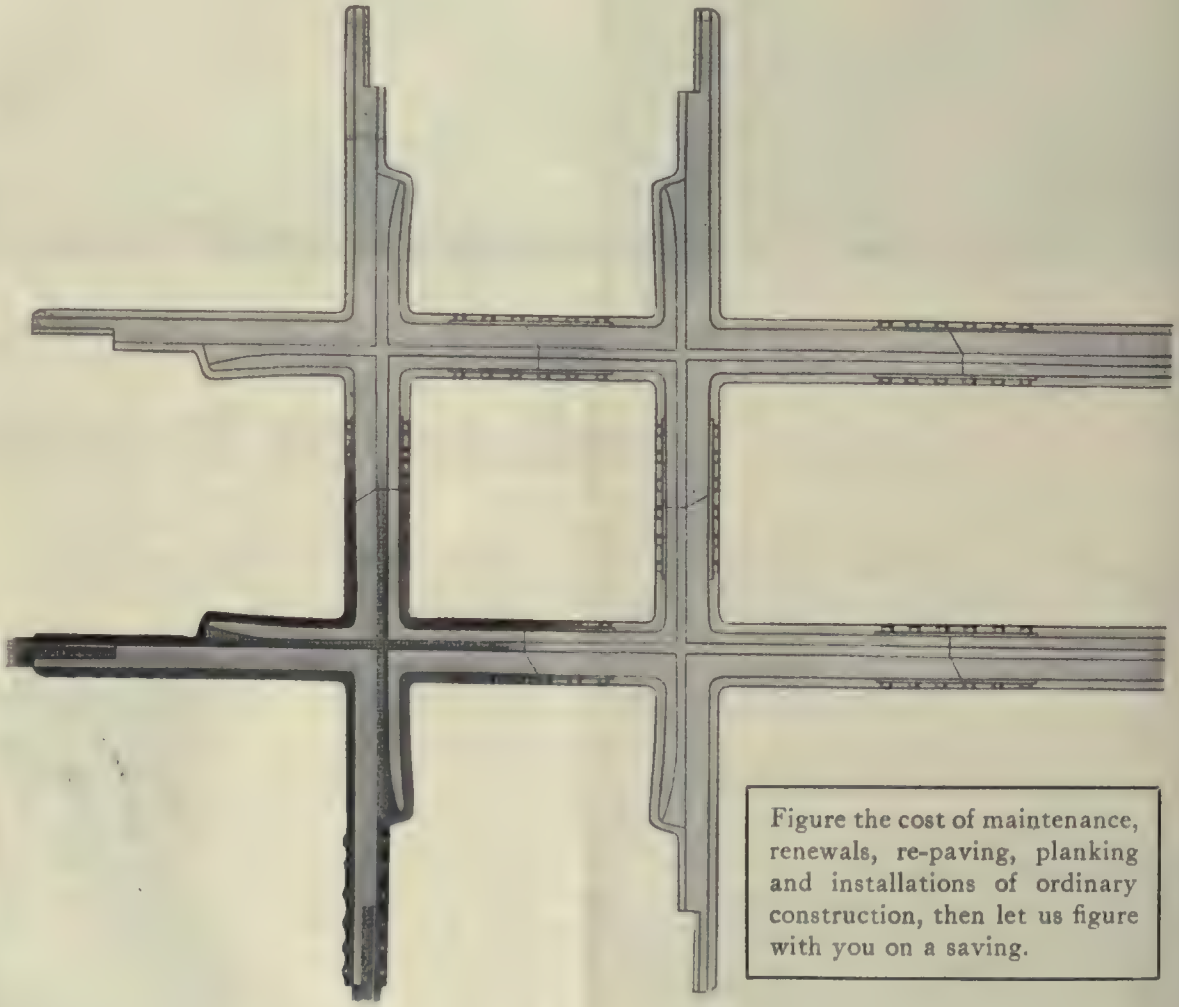


Figure the cost of maintenance, renewals, re-paving, planking and installations of ordinary construction, then let us figure with you on a saving.

Crossings made to Any Angle, for all sections of Girder and Tee Rails for Electric and Steam Railways.

**THE INDIANAPOLIS SWITCH & FROG CO.**
**SPRINGFIELD, OHIO**

# DAVIS STEEL WHEELS

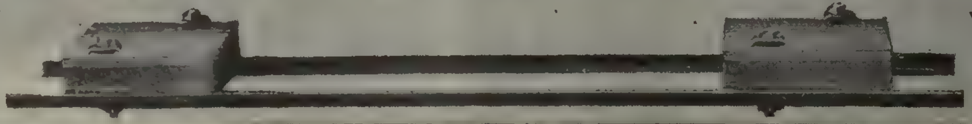
## Utmost Dependability

and minimized wheel expense—the result of Davis Steel Wheels under your electric line equipment.

The hard, tough manganese steel in tread and flange offer resistance to impact to a wonderful degree, thus greatly reducing the danger of broken flanges on sharp curves and cross-overs, and rendering large mileage without turning.

AMERICAN STEEL FOUNDRIES
1100 McCormick Building CHICAGO

The MECHANICAL RAILWAY TIE



Which Tie Do YOU Consider Most Economical?

The wooden tie that is cheaper to buy but costs six per cent. more to install and at the end of about ten years must be replaced?

Or the Dayton Mechanical Tie that costs more to buy but is permanent—even outlasts the pavement?

Many roads are just deciding that question NOW. They are installing

DAYTON MECHANICAL TIES

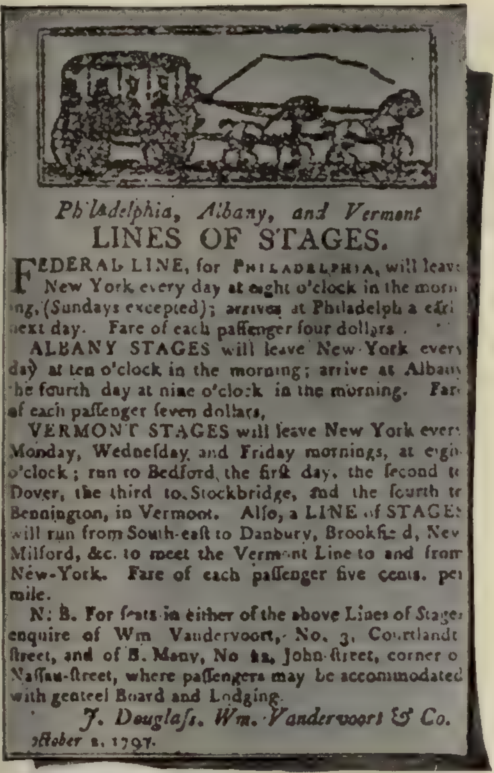
Not only do Dayton Mechanical Ties last longer, but they conserve the paving, car equipment and power.

The asphalt cushion under the wooden rail support eliminates jolt and jar and does away with battered joints.

To quote figures, the total cost of installing D. M. Ties on the D. & S. Ry. Co., with labor at 30 cents an hour, was $1.39 per foot—as opposed to $1.70 per foot for wooden ties—a clear saving of nearly 41 cents per foot, or 25 per cent. We will be glad to take these cost figures up in detail with you.

Get in touch with us now and let us go into this matter thoroughly. Special literature on installation costs sent on request.

THE DAYTON MECHANICAL TIE CO.
704 Commercial Building
DAYTON, OHIO



*Philadelphia, Albany, and Vermont*
LINES OF STAGES.

FEDERAL LINE, for PHILADELPHIA, will leav New York every day at eight o'clock in the morning, (Sundays excepted); arrives at Philadelphia ear next day. Fare of each paſſenger four dollars.

ALBANY STAGES will leave New-York ever day at ten o'clock in the morning; arrive at Alban he fourth day at nine o'clock in the morning. Far of each paſſenger ſeven dollars,

VERMONT STAGES will leave New York ever Monday, Wedneſday and Friday mornings, at eigh o'clock; run to Bedford the firſt day, the ſecond t Dover, the third to Stockbridge, and the fourth t Bennington, in Vermont. Alſo, a LINE of STAGE will run from South-eaſt to Danbury, Brookfield, Ne Milford, &c. to meet the Vermont Line to and fro New-York. Fare of each paſſenger five cents. pe mile.

N. B. For ſeats in either of the above Lines of Stage enquire of Wm Vandervoort, No. 3, Courtlandt ſtreet, and of B. Many, No 12, John-ſtreet, corner o Naſſau-ſtreet, where paſſengers may be accommodated with genteel Board and Lodging.

*J. Douglaſs. Wm. Vandervoort & Co.*
*ctober 2, 1797.*

# New York to Albany Three Days—Seven Dollars!

In 1797 Interurban travel was neither as cheap nor as convenient as it is today. One traveled much more slowly and without the present day comforts—in spite of the glowing description in the poster on the left.

In 1786—the first systematic attempt to run stages over the Albany Post Road was made by three Columbia County men who were granted by the state "exclusive right to set up, carry on and drive stage waggons" between New York and Albany on the East side of the Hudson River. Fare limited to four pence per mile. (About $13.00 to Albany)—trips made once a week.

In 1797 the road whose poster appears above was operating in full swing—and made its Albany stage run in three days with daily service and many other improvements, at a fare of seven dollars.

You can see that even in those early days the tendency was to lower fares—to create more comfort—to shorten the time on the road—in fact, to better conditions in every way—just as street railway men do today!

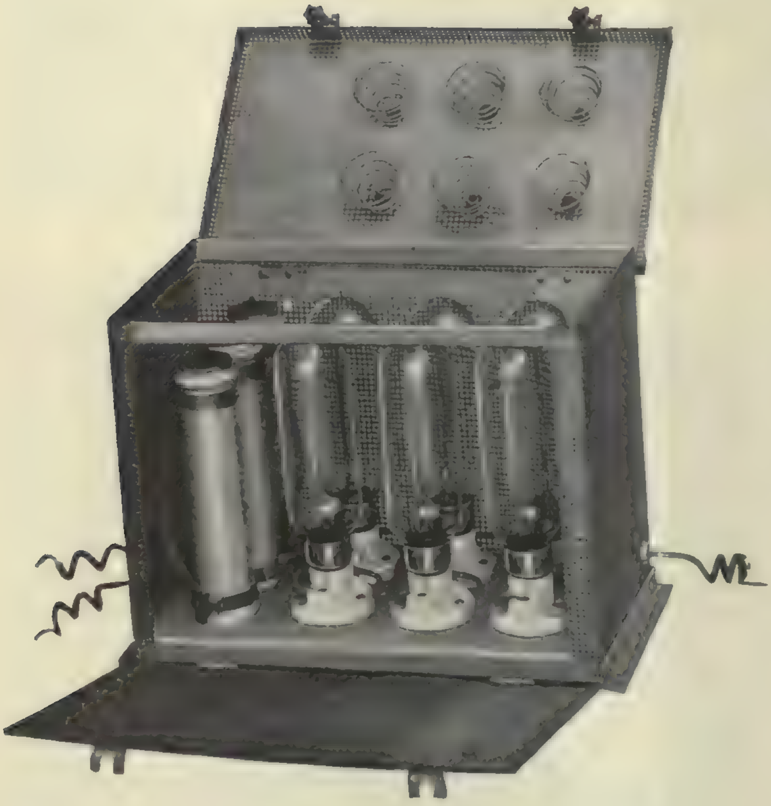
Transportation had its serious problems in the earlier days, even as it does today! Steadily increasing costs had to be met from a steadily diminishing fare—to which, there is only one answer—today or yesterday—namely—a more economical and more efficient operation.

# Galena Oils

coupled with Galena Service have served the street railways since their inception—while Galena Oils served the steam railroads before them. In spite of the fact that Galena Oils were naturally a more economical lubricant—the makers inaugurated Galena Service to make Galena Oils even more economical, and more efficient. Result—100% Satisfaction.

## Galena-Signal Oil Co.

Franklin, Pa.



# The GECO Resistor

The GECO Resistor is an automatic regulating device for maintaining even voltage for incandescent headlights despite variations in trolley line potential.

The chief points of advantage are:

- **No moving parts.**
- **No contacts or solenoids to get out of order.**
- **Occupies small space.**
- **Is easily installed.**
- **Is low in first cost and maintenance.**
- **Has given satisfactory service for two years on several roads.**

The GECO Resistor consists of six resistor units operating three in series (two circuits in multiple), and three resistance coils wound on porcelain sticks. These coils are used for dimming the headlight within city limits, and are thrown out of line by means of a conveniently located switch. All the elements are contained in a perforated metal casing usually located in the car vestibule.

GECO Resistors on your cars mean maximum speed with maximum safety because

**GECO Lights are always bright**

**General Electric Company**

General Office Schenectady, N.Y.

35-34

# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

*Volume* 53 New York, Saturday, June 28, 1919 *Number* 26

## What Shall We Term the "Safety Car"?

THE discussion now in progress regarding phraseology to be used in connection with the light-weight, quick-service, one-man, etc., safety car reminds one of the early days of the bicycle. Once upon a time these machines were made with a big wheel in front and a little one behind, or vice-versa. With the former, the rider struck on his nose; with the latter, on the back of his head. Then came the "safety bicycle" or "safety," which had also virtues other than the name indicated; but this term appealed to the public and stuck until the new type of wheel had replaced the others. Then the machine was simply a "bicycle" again. In the case of the one-man car, only usage will in the long run determine the name. Managers, among themselves, will naturally often refer to the "one-man" car; in publicity work "safety" or "frequent-service" car is perhaps better. Variety in this matter is not undesirable. Sometimes force in statement will result from the use of more than one term.

## Carry the Message to the Public

A REAL OPPORTUNITY is afforded in the coming hearings of the Federal Electric Railways Commission for the electric railway companies to get their case before the public. Up to this time the electric railways have realized the seriousness of their situation, but the public as a whole has not. Most people are not accustomed to worry much about the troubles of others. It is much easier for the average citizen to assume that the companies would get out of their troubles somehow, and if they did not, it would not greatly affect his daily life or fortune.

But with a federal commission engaged on the subject, the matter immediately acquires national and consequently journalistic interest. The testimony presented last week by Mr. Taft was sent out broadcast by the press agencies and helped to carry the lesson that something must be done. The original appointment of the commission and the preliminary correspondence in relation thereto between the Secretaries of Commerce and Labor and the President also attracted wide attention.

We dwell upon this phase of the hearings because it is an incidental advantage of the investigation now under way and one in which the railways can help. The duty of the commission is to get the facts and report upon them. The main duty of the railways is to supply these facts, so far as they can, but with this duty there is the opportunity just mentioned, namely, to help give these facts publicity through company publications, car cards, local daily papers and other ways.

With this publicity should be combined the thought of what the public owes the railways. Too many people think of what the railways owe the public without considering that there is any reciprocal responsibility. They insist that the railways should be ready always to furnish good and safe service in attractive, comfortable cars, and this is true. But they often forget that this can be done only when the public is willing to pay a reasonable price for that service, to co-operate with the company where it can be done and to boost and not knock. It is only where this responsibility is recognized that the best service can be given.

## What Would Accelerate the Adoption of Standards?

THE American Electric Railway Engineering Association has been laboring a long time in the field of much-needed standardization in the several branches of electric railway engineering which come within its scope. It has adopted a number of standards and besides these its "Engineering Manual" sets forth many recommended practices which have substantially the same force and effect as the standards themselves. Nevertheless, the committee on standards, through a questionnaire put out about three years ago, found that only a very small portion of the association membership has adopted the standards. There appeared to be an inexplicable apathy on the part of the membership toward the standards, and while strong efforts have since been made looking toward their wider use, there has been but little progress recorded. This situation seems to indicate either one of two things: (1) The standards are not satisfactory, or (2) the membership really does not want standards.

The same conditions seem to exist in regard to the general failure of the steam roads to use the valuable standards and recommendations of the American Railway Engineering Association. Perhaps one of the reasons for this state of affairs in connection with both engineering associations may be found in the last clause of the statement found at the head of the Proceedings of the American Railway Engineering Association, to wit: "Its action is not binding upon its members." Another reason may possibly be found in the failure of those in responsible management to interest themselves in the subject. Let the general managers take a positive stand to the effect that association standards must be used wherever possible and we venture to predict a surprising increase in the rate of progress in standardization.

One of the most depressing of the reasons assigned by those who do not use the standards was that ancient crutch: "Local conditions prevent using." This has been ascribed from time immemorial by the unprogressive as the reason for staying in a rut. It may well be asked, "Why have any standards if no one will even make an effort to use them?" Of what use are the expensive technical committees if the results of their labors are to be passed over so lightly? A standard in the Manual is of little value, while one in use on the majority of roads should be worth much to all of them.

We are coming more and more to the view that strong measures must be taken if standardization is ever to become general in the electric railway field. The sudden cessation of the war was the only reason why the government did not take a hand in standardizing girder guard rails. Had the war lasted three months more, we should have been forced to use some one of only seven guard rails which the mills were to be allowed to roll. These were to have been selected from the hundred or more for which each of the mills possesses rolls. If this condition had come to pass, "local conditions" could not have prevailed and the adoption of guard-rail standards would have been advanced several years. The rail mills could accomplish the same result if they would arbitrarily confine their rollings to a few sections which would be furnished at the prevailing price, while all other sections would only be furnished at an increased price. Thus those who insisted on purchasing small tonnages of non-standard rails would pay the price for their non-conformity. Most rail users would soon see the expensiveness of individuality.

## Why Not Get the Security Holders to Help?

IT IS SO UNUSUAL to find in the daily papers any word of commendation for public utilities, especially from "Pro Bono Publico" and similar correspondents, that when such friendly comments do appear, someone else writes in to inquire if the anonymous contributor is a security holder in the company referred to. This calls to mind the suggestion made by a banker recently that those who have invested in utility securities could do much to protect their investments if they were as active in calling for fair treatment as the opposition is in decrying any measures looking toward relief for these companies.

It occurs to us that such a plan would be specially effective in the smaller cities and towns. There are hundreds of thousands, perhaps millions, of persons throughout the country who have invested in such securities. In a small city where the individual counts for something and is known to his neighbors it would undoubtedly be a surprise to the community to find that it was not only men of wealth who were affected by the popular sport of crushing the transportation agencies. There is more or less prejudice against capitalists, but if it could be made known how widely distributed the utility holdings are there would surely be a more popular reception of appeals for fair play. To be effective, the stock or bondholder need not necessarily be a resident of the town in which the property is located, especially if it is one which is growing and seeking capital for civic improvements, as in the case with many towns, particularly in the West. To such communities a reputation for fairness to investors in the enterprises in their city is sought after, at least in the abstract. In such cities requests for fair treatment of the local transportation enterprise from those in a position to lend money should receive consideration.

Some effort has been made along these lines by companies with their stockholders but the bondholders have usually been considered as a class from which no assistance could or should be expected. This is so no longer, at least with most electric railway companies. Danger of loss of capital threatens not only the owners of the stock but those of the bonds as well. We should be glad to see some effort made to enlist their help, not only for individual cases but for assistance in solving the broad questions which affect the whole industry.

## A Receiver Cannot Do The Impossible

SOME strange views exist as to the powers of a receiver. When a public utility company is hard pressed and it is hinted that a receivership is impending, a certain portion of the patrons may be heard to say "We should worry. It isn't our funeral, and besides the receiver may force the company to buy more cars and give better service."

As a matter of fact a receiver cannot do the impossible. He cannot get blood out of a turnip. A receivership generally means that the property in question is financially sick and that a "doctor" is required to prevent collapse. If the community is at all dependent upon the utility for its progress and well being, it should be an occasion of serious concern to all good citizens when such drastic measures are necessary.

A receiver is first of all an agent of a judicial tribunal, and he may do only what the court permits him to do. The primary purpose of his appointment is to preserve the value of the property for the interest of the creditors, and this object he must keep constantly in mind. What a receiver does must be legal or his actions can be undone. Under the protection of the court the ailing corporation, or rather its creditors, through their representative the receiver, may borrow some money for improvements, but the property must be able to earn a return on this capital. If there is any legal means to secure additional revenue, such as by raising fares, the receiver may also secure this help through the court. It must be remembered also that a receiver may receive authority to abandon non-productive routes, so that the people who depend on these routes for business development are likely to suffer from the conditions which made a receivership necessary.

## A. R. A. Meeting Presages a Rousing October Convention

ATLANTIC CITY surrendered to the steam railroad mechanical department men who held an oldtime convention from June 18 to 25 on the familiar "million-dollar pier" in that metropolis by the sea. The attendance, spirit and interest in things technical and social passed all expectations. The men present at the meetings seemed impressed with the masterly way in which the sessions were handled and with the earnestness with which the discussions were followed. The last-named characteristic is at least partly attributable to the suggestion sent out by the Railroad Administration that the men who attended should study the proceedings with a definite view to reporting to their superiors as to methods of applying the lessons of the convention directly to their own properties. As long as the roads are in Uncle Sam's hands such a suggestion comes almost with the force of law.

This paper has advocated a similar use of the electric railway association meetings. While there is no centralized authority which can say in essence to all electric railway men at once that they are expected to go to the convention to get concrete suggestions applicable to their respective properties, yet there is an economic compulsion impelling them to do so. Undoubtedly many roads already have in operation definite plans to enable the convention attendants to get the teachings of the meetings directly and promptly to all employees who must apply these lessons if they are to be applied. Such a program, combined with careful study of the proceedings as reported in this paper, will insure an immediate and adequate return upon the considerable investment of money, time and energy which the convention involves.

There was a time when, very properly, the annual convention of the electric railway industry was looked upon primarily as an outing. Then there were few matters of vital interest affecting the utility as a whole. Now the opposite condition pertains, and the annual meeting of the American Electric Railway Association affords the only opportunity for a general taking account of stock and lining up the companies for a general advance. From considerations of necessity if no other, the coming one, of all conventions, ought to be the best, and reasoning from the success of the steam road meeting, it is going to be so.

## Use Prepayment Areas to Multiply One-Man Cars

IT IS REMARKABLE what applications we can find for the modern one-man car if we really go about the matter from the new point of view of a device that can do so much to cut expenses and enlarge revenues and service. For example, where we would hesitate to try rerouting for big cars, we can justify the cost in advance if it will permit us to operate the smaller, lighter but more numerous units.

Regardless of rerouting, which may be delayed by technicalities concerning franchises, we can find wider application for the one-man car by installing prepayment areas to the greatest practicable degree at all those points where passengers board the cars *en masse*. This means that one or two cashiers will do the work of a score or more conductors; that the patrons will board the car from a higher level (perhaps flush with the car platforms), that doors at both ends of every car will be available for entrance, and that as the cars will get away faster the capacity of the terminal tracks will be appreciably increased. Once the cars, be they big or small, have left the prepayment area, their main work will be the discharge and not the taking on of passengers. In the morning, of course, they will pick up a full load eventually, but as the passengers will board in ones, twos and threes, the operator will not be subjected to any unusual effort. Further, in some cases—as where most riders are going to a large factory—the prepayment station at this point can be turned into a pay-as-you-leave area for the discharged riders, other riders paying as they leave the car.

An additional incentive toward the greater use of the prepayment-postpayment area is the coming of the odd flat or odd zone fare. We have seen for ourselves that even a change-making booth will not prevent the thoughtless or the selfish from boarding and delaying a prepayment car because they lack the exact change. Another good reason for the most liberal use of the prepayment area is in the opportunity it affords to give the customers a pleasant shelter while waiting for their cars. Protection against the weather, maximum ease in tendering fare and absence of all effort and pushing in boarding the cars will leave a pleasant "I'll come again" taste in the mouth of every patron. And last but not least, the prepayment area will bring the railway all the money paid by all the riders.

## Post-War Maintenance Demands Trained Workers

AMONG the many significant things said and done at the Atlantic City meeting of the mechanical section of the American Railroad Association, none was more suggestive than the statement made by F. W. Brazier, superintendent of rolling stock New York Central Lines, of the great need for good mechanics in the car department of steam railroads. If this is true of these roads, which have been agitating the subject of apprentice training for so many years, what is to be said of the situation on electric railway properties? Echo answers, "What?"

Steam road shops are, on the average, large compared with the general run of electric railway shops. The mechanical departments, moreover, embrace many groups of men working in well-defined trades. It would seem, therefore, that with a demand as pressing as that which Mr. Brazier describes, and in view of the liberality in the matter of wages which the Railroad Administration has shown, the operation of apprentice systems with auxiliary mental training ought to be the usual and successful practice.

Electric railway master mechanics will have a tendency to throw up their hands and declare that if the steam roads cannot do any better than they have done, with so many elements in their favor, what can be done in the average small city or interurban road shop where the men are few, with duties not always well defined and with no money available to pay wages high enough to attract high-grade men. This attitude may be natural enough, but it will never get us anywhere. Granted that conditions are in many ways unfavorable, there are compensations, too. The relatively small size of the shop force permits close contact between master mechanic and men; and the same condition pertains with regard to the roadmaster, the overhead superintendent, the power plant engineer and their respective staffs. Elaborate systems of apprentice training are not usually practicable, but provision can be made for the development of individuals, with group instruction under appropriate circumstances.

An elaborate investigation among electric railways, made by the writer before the war set in, disclosed a very considerable lack of plan in developing skilled mechanics. While at that time there was not the acute labor shortage that has developed later, there was a shortage in real skill, the old-fashioned craftsmanship. The one-time process of "learning a trade," unsystematic as it often was, had been outgrown.

The American Association had at one time a committee on apprentice training. This "went by the board" in due course, for lack of support. Possibly the war period has so changed the labor situation that this committee should be revived or one with a somewhat different scope should be created. There are several men in the association vitally interested in this matter and their services should be secured for such a committee.

# The Zone Fare in Practice

## READING

**More than 180 Rides Per Passenger Per Annum in a Community of 88,000—Combination of Penny Short Rides and 1½-Penny Rides from Center to End of Line, with Second Collection if Ride Is Across Town—Recent Fare Increase Has Been Successful in Increasing Revenue Although Closing of Aircraft School Cut Traffic**

BY WALTER JACKSON

BATH ROAD, READING, IN THE WEALTHIER DISTRICT

ABOUT 40 miles west of London lies Reading, the mother city of Reading, Pa. It is somewhat smaller than its daughter, the population of the extended borough of Reading being 88,000 compared with 96,000 for the younger American city. There are not many resemblances between the two cities in general layout, but except for the older portion of the English city there is the same prevalence of small dwellings.

Reading, England, is not only an industrial community but also a commuting town for many men whose work lies in London. Consequently, the visitor will find a large number of one-family houses on ample grounds in addition to the closely built but small houses of the working classes. In the business section, buildings are rarely more than four stories high, while high tenements are non-existent. On the whole, then, the problem of congestion does not worry this famous old city on the Thames.

The principal source of the local traffic is a great biscuit bakery employing about 7000 people. Other establishments, including an equally famous seed business, as shown on the accompanying map, do not all together equal in size the biscuit plant. Fortunately for the tramways, most of these places are not too close to the residential sections.

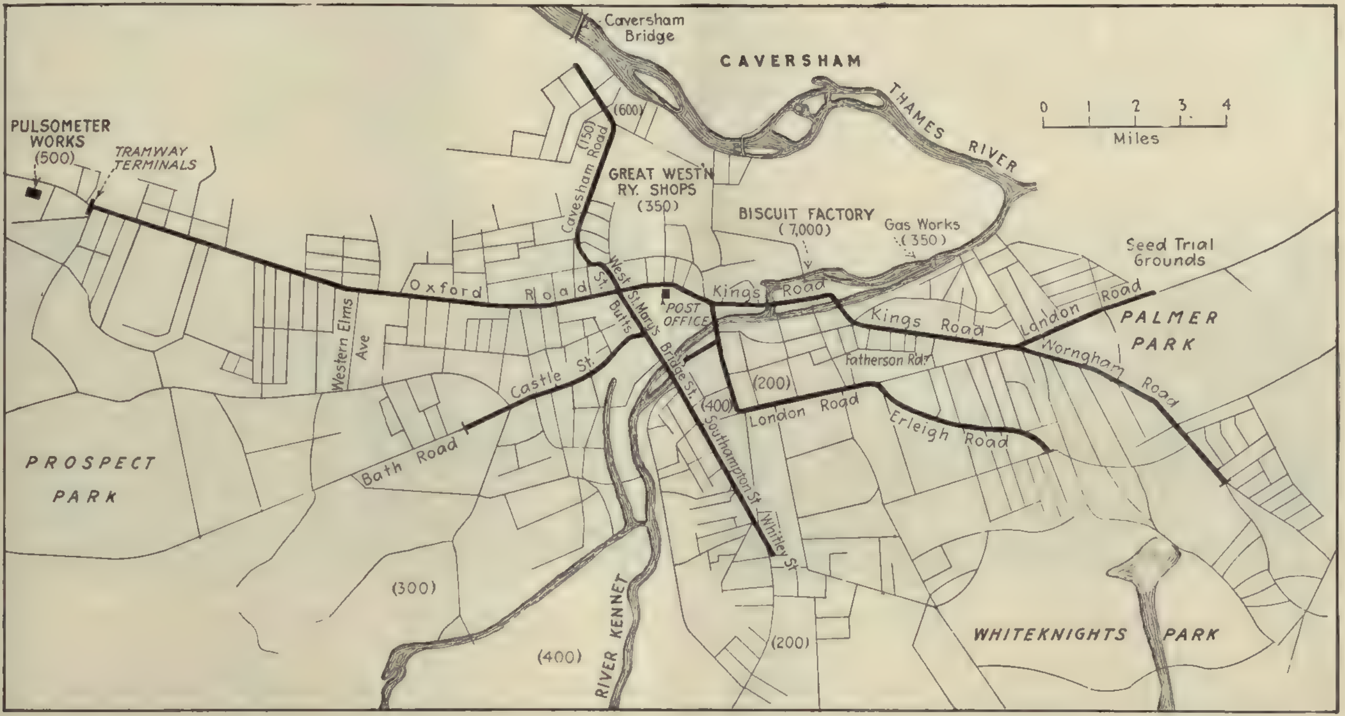
In addition to this business traffic there is that of the London commuter all the year round, while in the summer the popularity of boating on the Thames brings many pleasure seekers to Reading. It is hardly necessary to add that during the years of the great war, the last-named class of travel suffered. A set-off thereto was the development of Reading as an aircraft center.

### ROUTING AND DENSITY OF TRAFFIC

The total length of single track in Reading is slightly in excess of 13 miles. Nearly all of this, or about 6 miles of route, is double-track, and the remaining single-track sections are to be double-tracked as soon as feasible. A good deal of rosette span construction is used as the successor to center-pole construction, which was removed because of increased automobile traffic. The Reading Corporation Tramways has compulsory powers to install rosettes, paying the owner of the building a nominal fee of 1s. per annum. In accordance with general British practice, offset trolley wire is common in order to avoid long brackets in double-track side-pole construction.

The map clearly indicates the routing scheme, namely, through routes both east-west and north-south. The main line, Oxford Road to Wokingham Road, 3.4 miles long, serves both residential and working-class districts, with a standard headway of five minutes with extras during the morning, noon and evening rush hours. At the old rate of fare it carried 4,192,195 1d. passengers and 60,550 2d. passengers during the six months ended Sept. 30, 1918—a substantial rate of increase over the fiscal twelve months ended March 31, 1918, when 6,609,949 1d. and 77,898 2d. passengers were carried.

Since May, 1918, fuel-saving considerations caused a revision of the triangular through line Erleigh Road-



ROUTE MAP OF READING, WITH LOCATIONS OF PRINCIPAL INDUSTRIES AND NUMBER OF EMPLOYEES

Caversham-Whitley, which had a flat seven and a half minute service over 6.39 miles of route and carried 3,826,240 1d. passengers and 19,650 2d. passengers during the fiscal year ended March 31, 1918. The triangle has been replaced by two through routes—Erleigh Road to Bath Road via Broad Street, 2.19 miles long, and Whitley Street to Caversham Road, 1.67 miles long. This change eliminated the doubling back on the 1.55 mile leg between Erleigh Road terminus and the junction of West and Broad Streets.

It is not possible to make a direct comparison showing the way traffic was affected by the foregoing rerouting, but the figures may be of interest in showing the density of travel. Thus the Erleigh-Bath line, 2.18 miles long, with a residential patronage and a flat ten-minute service, carried 787,883 1d. passengers and 22,840 2d. passengers during the five months, from May 1 to Sept. 30, 1918. The Caversham-Whitley line, 1.67 miles long, serving a working-class district with a six-minute service, carried 1,923,912 passengers, all at the then prevailing rate of 1d., during the six months ended Sept. 30, 1918.

The Bath Road-London Road route was also abandoned in May, 1918, because of coal restrictions. As an independent line it had a flat ten-minute service over its 2.26 miles of route, serving suburban traffic largely with some working class traffic at the London Road end. The total traffic was 906,448 1d. passengers and 5277 2d. passengers during the fiscal year ended March 31, 1918. The route is now a part of the Erleigh-Bath line, except that one special car is added for Bath-London service during the morning, noon and evening peaks.

PREVAILING STYLE OF WORKMEN'S HOUSES ON OXFORD STREET—NO BIG TENEMENTS IN READING

### INCREASE IN FARE

Until Jan. 12, 1919, rides up to 1.89 miles were obtainable for the minimum penny fare. There was also one overlapping penny stage across town, 1.71 miles long, from Western Elms Avenue to Fatherson Road. In general, a ride from the center of the city to the end of any line cost only 1d. to the regular passenger, or 2d. if he rode across town.

Under the new schedule the penny rate is retained only for stages up to 0.9 mile, and a flat fare of 1½d. is charged for a ride from the center to the end of any line. As the confusing overlap has been abolished, the main line ride of 3.4 miles would cost 3d., the second 1½d. fare being collected separately as a precaution against over-riding. This particular line is divided into four stages at Oxford Road, Western Elms Avenue and General Post Office going east and at Wokingham Road, Fatherson Road and West Street junction going west. The Post Office and West Street junction are only about 200 ft. apart, so that this neutral zone is not an overlap in the usual sense in which that term is understood.

The result of the fare increase to date is indicated by the following figures, but it should be noted that the closing down of the school of the Royal Air Force coincided with the day on which the new fare system was introduced. The several thousand officers and cadets of the Royal Air Force formed a very re-

AT LEFT, IN THE SUBURBAN DISTRICT OF OXFORD ROAD, READING; AT RIGHT, WEST STREET, SHOWING THE PREVAILING TYPE OF DOWNTOWN BUILDINGS

munerative class of passengers; in many cases they would travel distances of only 1500 to 1600 ft. and pay their fare of 1d. Even as regards the ordinary passenger, it should be emphasized that a large proportion of the traffic, under the new rates, must come from people who can be induced to ride 0.9 mile or less. The figures for various days of January and Feb. 3 are:

| Date | 1918 |  | 1919 |  |
|---|---|---|---|---|
|  | Receipts | Passengers | Receipts | Passengers |
| January 17 | £175 | 39,458 | £205 | 36,448 |
| January 18 | 228 | 53,324 | 261 | 48,250 |
| January 21 | 157 | 36,188 | 218 | 34,447 |
| January 29 | 149 | 31,309 | 182 | 31,949 |
| January 30 | 146 | 31,504 | 207 | 33,100 |
| February 3 | 156 | 35,783 | 183 | 32,221 |

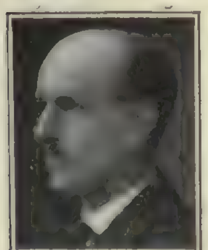
On a weekly basis, figures up to the week ended Feb. 27 are:

| Week Ended | 1918 |  | 1919 |  |
|---|---|---|---|---|
|  | Receipts | Passengers | Receipts | Passengers |
| January 16 (part) | £588 | 138,169 | £813 | 151,175 |
| January 23 | 1,140 | 268,551 | 1,327 | 253,060 |
| January 30 | 1,065 | 250,426 | 1,247 | 234,898 |
| February 6 | 1,109 | 266,978 | 1,233 | 229,407 |
| February 13 | 1,165 | 271,481 | 1,237 | 230,726 |
| February 20 | 1,120 | 263,962 | 1,308 | 250,717 |
| February 27 | 1,145 | 268,588 | 1,324 | 244,804 |
| Total | £7,335 | 1,728,155 | £8,491 | 1,594,787 |

Loss in passengers, 8 per cent—gain in revenue, 15.7 per cent.

When due allowance is made for the shutting down of the aircraft school, it is clear that the fare increase at Reading has gone over the top as well as could be expected in a small city. Such losses as were suffered by its American daughter city are certainly not evident.

In addition to the full-price tickets, the Reading Corporation Tramways sells several other varieties at reduced rates as follows:

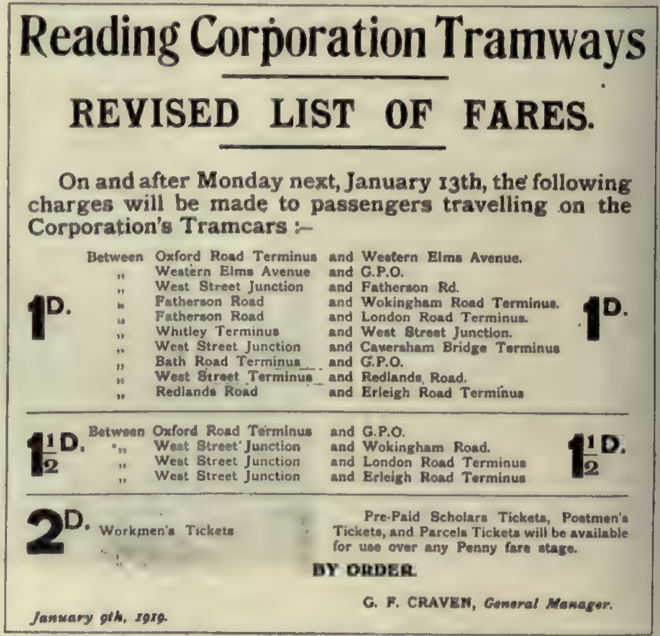


**GEORGE FREDERICK CRAVEN**, the thirty-six-year-old manager of the Reading Corporation Tramways, is an engineer by profession. He is an associate member of the Institution of Civil Engineers, a member of the Institution of Electrical Engineers and a member of the Institution of Mechanical Engineers. He has been in his present appointment for the last six years. During the war the Reading Tramways Department undertook some special war work, and Mr. Craven has to his credit the design of some interesting specialties which were adopted and used. Mr. Craven holds the office of honorable secretary to No. 2 (Board of Trade) Tramways Area; he is district engineer for Industrial Coal Supplies under the Coal Controller, and in addition he holds the post of local fuel overseer under the Household Fuel and Lighting Order of 1918. During the war he gave advice on electrical matters to several large engineering firms and other manufacturers in the borough of Reading.

Workmen's return tickets, price 2d, are issued before 7.45 a. m. each weekday. These may be used for any return trip during any day except after 1.30 p.m. on Saturdays. On the return journey, the passenger gives up this ticket in exchange for a punched fare receipt surprinted "W" in red to distinguish it from fare receipts given for single-trip cash fares.

School tickets at ½d. each permit the user to ride a 1d. stage per ticket between 8 a.m. and 6 p.m. on Mondays to Friday inclusive, and between 8 a.m. and 1.30 p.m. on Saturdays. They are not available on Sundays and holidays. Such tickets must be given up to the conductor, who issues therefor exchange fare receipts surprinted "E." Although these tickets are sold only in bundles of twenty-four per shilling, it is customary for school teachers to retail smaller lots to their poorer pupils. The age limit of the holder of a school ticket is fifteen years.

The prepaid ticket illustrated is sold at full price in lots of thirty to merchants and others who prefer to give their messengers tickets instead of money for car rides. Each ticket is good for a penny stage and must be delivered to the conductor for an exchange ticket. In like manner, the letter carriers' tickets, which are sold to the post office at the rate of thirteen



# Reading Corporation Tramways

## REVISED LIST OF FARES.

On and after Monday next, January 13th, the following charges will be made to passengers travelling on the Corporation's Tramcars :—

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| 1D. | Between | Oxford Road Terminus | and Western Elms Avenue. | 1D. |
|  | " | Western Elms Avenue | and G.P.O. |  |
|  | " | West Street Junction | and Fatherson Rd. |  |
|  | " | Fatherson Road | and Wokingham Road Terminus. |  |
|  | " | Fatherson Road | and London Road Terminus. |  |
|  | " | Whitley Terminus | and West Street Junction. |  |
|  | " | West Street Junction | and Caversham Bridge Terminus |  |
|  | " | Bath Road Terminus | and G.P.O. |  |
|  | " | West Street Terminus | and Redlands Road. |  |
|  | " | Redlands Road | and Erleigh Road Terminus |  |
| 1½D. | Between | Oxford Road Terminus | and G.P.O. | 1½D. |
|  | " | West Street Junction | and Wokingham Road. |  |
|  | " | West Street Junction | and London Road Terminus |  |
|  | " | West Street Junction | and Erleigh Road Terminus |  |

2D. Workmen's Tickets

Pre-Paid Scholars Tickets, Postmen's Tickets, and Parcels Tickets will be available for use over any Penny fare stage.

BY ORDER.

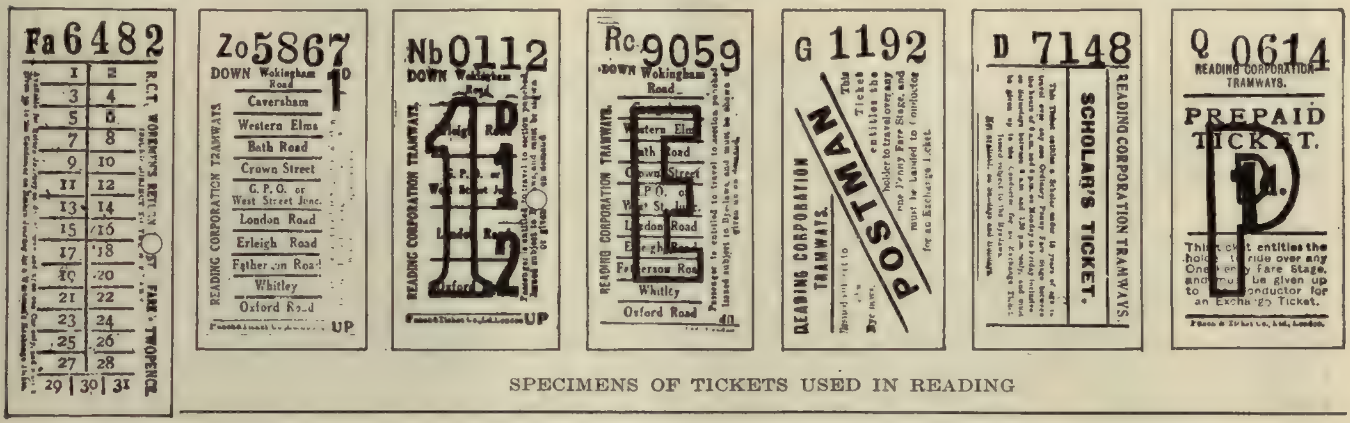
G. F. CRAVEN, *General Manager.*

*January 9th, 1919.*

POSTER ANNOUNCING READING FARE INCREASE

instead of twelve penny tickets for a shilling, must also be given up for exchange fare receipts.

It should be clear from the foregoing that no matter what rate of fare the passenger pays, he must have a fare receipt that proves he is entitled to ride.



SPECIMENS OF TICKETS USED IN READING

As already described in the case of the Aberdeen Corporation Tramways, all the tickets assigned to any one conductor are taken in serial order out of a bin containing 10,000 of each classification. The estimated requirements for the day, together with waybill and punch, are put up in an individual box which is handed to the conductor when he reports for the day's work. The identifications, the quantity and the last and the first numbers of the tickets are already written down on the waybill when he receives his stock, so that he can check the ticket numbers and the punch reading, before leaving. The conductor himself writes down the record of exchange tickets, "First numbers returned to office" and "Quantity sold," and figures out the amount of cash he should turn in. Conductors are allowed to hold 2s. for change. Overs are returned to the conductors, and shorts must be made up by them.

Unlike the practice on some other properties, the conductor does not get the same punch all the time. Punches are rented from the Williamson Ticket Printer, Ashton-under-Lyne.

All transactions with the conductors are carried out at the office of the traffic superintendent. The staff comprises two cash clerks, two checking clerks and two boys. One of the latter fills the conductors' ticket boxes, and the other is used for miscellaneous service.

In a city with one predominant industry, the electric railway is at a disadvantage compared with the lines in larger places having varied industries. Quite recently, however, the Reading biscuit bakery adopted a forty-eight hour week for its 7000 employees, thereby abolishing breakfast riding and emphasizing the morning peak. This plant now opens at 8 a.m. and has a luncheon period from 12.30 to 1.45 p.m. A number of the smaller places begin at 6 a.m. and have a breakfast period beginning at 8 or 8.30 a.m. and a luncheon period from 1 to 2 p.m. Suggestions to stagger the hours of opening and closing have been made, but housekeepers object to preparing breakfasts at different hours for different members of the family.

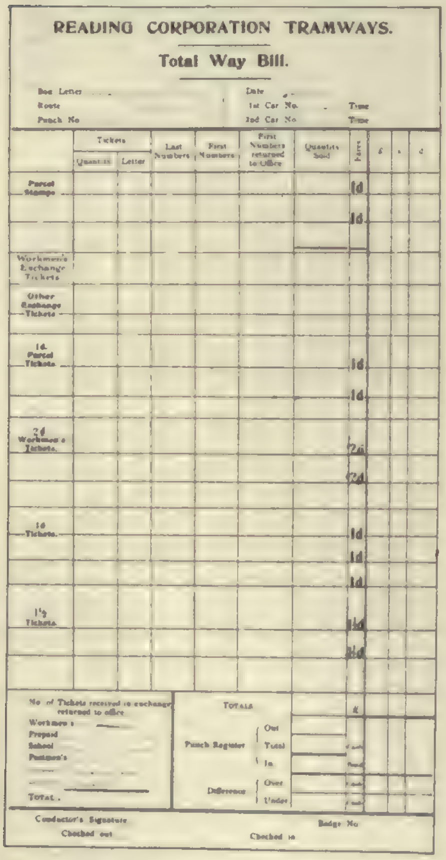
There is no bus service in Reading. Although buses are operated through the city from near-by towns, they are not used for local riding as the rate of fare is practically triple that of the tramway. Tramway service begins at 5.15 a.m. with the workmen's cars and ends at 11 p.m., forty-five minutes earlier than before the war. On the main line cars are operated at a schedule speed of 8½ m.p.h., and the minimum on the shorter lines is 7 m.p.h. These schedules are to be expected in view of the size of the town and the necessity of frequent stops to encourage the short rider. The stops, in fact, are spaced 450 ft. to 600 ft., variations depending upon the location of traffic-gathering points, such as converging streets and important buildings.

The system has thirty-six cars, of which six are double-truck. The smaller cars seat twenty-two on the

LATEST DESIGN OF READING DOUBLE-DECK CAR, AND INTERIOR VIEW OF LATEST CAR, WITH FARE ANNOUNCEMENT ON BULKHEAD lower deck in longitudinal seats and twenty-six on the open upper deck in cross seats. The larger cars, which are 33 ft. 6 in. over all, seat thirty below and forty-two above, all in cross-seats. There is no limitation as to standing. Because of railway viaducts, Reading's cars have no top covers.

All cars are mounted on Brill trucks. The single-truck cars carry two DK-25-A 25-hp. motors and Dick-Kerr DB-1 Form B controllers, and the double-truck cars carry Dick-Kerr 6-A or 20-A 40-hp. interpole motors with DB-1 Form C controllers or the Dick-Kerr 6-K controllers with non-detachable handle. Most of the hand brakes are of Ackley type, with a few Peacocks as well.

The lighting circuits per car are three in number, with five 16-cp. lamps per circuit. Incandescent lamps are used for the headlight, for the colored route-indicating light suspended above the motorman and for the roller-type destination signs. In addition to the two 250-volt grounding indicator lamps specified by Board of Trade regulations, which are in series between the trolley base and the ground, a bell is used for a leakage indicator as the bell ringing is more noticeable than lighting of the lamps.



READING CORPORATION TRAMWAYS.

Total Way Bill.

Box Letter
Route
Punch No
Date
1st Car No. Time
2nd Car No Time

| | Tickets Quantity | Tickets Letter | Last Numbers | First Numbers | First Numbers returned to Office | Quantity Sold | Fares | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|---|---|
| Parcel Stamps | | | | | | | 1d | | | |
| | | | | | | | 1d | | | |
| | | | | | | | | | | |
| Workmen's Exchange Tickets | | | | | | | | | | |
| Other Exchange Tickets | | | | | | | | | | |
| | | | | | | | | | | |
| 1d. Parcel Tickets | | | | | | | 1d | | | |
| | | | | | | | 1d | | | |
| | | | | | | | | | | |
| 2d Workmen's Tickets | | | | | | | 2d | | | |
| | | | | | | | 2d | | | |
| | | | | | | | | | | |
| 1d Tickets | | | | | | | 1d | | | |
| | | | | | | | 1d | | | |
| | | | | | | | 1d | | | |
| 1½ Tickets | | | | | | | 1½d | | | |
| | | | | | | | [illegible] | | | |
| | | | | | | | | | | |

No. of Tickets received in exchange returned to office
Workmen's
Prepaid
School
Postmen's
Total.

Totals £
Punch Register Out
Total
In
Difference Over
Under

Conductor's Signature
Badge No
Checked out
Checked in

READING ALL-DAY WAYBILL

The latest type of single-truck car, built in the local shops, is shown in the accompanying illustrations. It is 27 ft. 6 in. over all with 5 ft. 6 in. platforms, bulkhead doors 24 in. wide in the clear, step 14 in. high arranged to be folded directly by hand (not through a platform handle), and 33-in. wheels. Ventilation is provided by means of small end-hinged windows over the main windows, arranged to open one way on one side and the opposite way on the other, according to the direction of running.

In this car all filigree work has been eliminated, and the customary veneer finish is replaced by white enamel composition board. The two roller destination signs are placed at opposite ends on the upper deck. They are illuminated by means of two 16-cp. lamps. On the ground glass back of the front sign appears the admonition: "Kindly tender copper for your fare," and on the back of the rear sign the passenger is asked to "Please obtain ticket for every fare paid."

During the fiscal year ended March 31, 1918, the traffic receipts (exclusive of parcels service, advertising, etc.) of the Reading Corporation Tramways were £55,212 (approximately $276,000), corresponding to the carriage of 13,771,598 passengers as follows:

| | |
|---|---|
| Prepaid tickets to city departments, full value | 38,220 |
| Prepaid tickets to business houses, full value | 14,910 |
| Free and charity | 7,320 |
| School education committee | 84,000 |
| School tickets to individuals | 275,808 |
| Workmen's return tickets | 616,561 |
| Postmen's tickets | 25,323 |
| Regular tickets | 12,710,356 |
| Total | 13,771,598 |

On the basis of population served by Reading alone, namely, 76,500, the number of rides per annum per inhabitant rose from 143 to 180 in the fiscal year ended March 31, 1918, as compared with the preceding year. Traffic has kept on increasing at such a rate, however, that the figure of 180 may be said to apply now to the borough population of 88,000. In the last fiscal year the effect of the rerouting and increased travel is indicated by the increase in passengers per car-mile from 11.97 to 14.97. At the same time, the annual car-miles were increased from 912,258 to 920,174 car-miles, while the daily run per car rose from 89.3 miles to 93.4 miles.

In spite of the fact that the operating ratio rose from 53.41 per cent to 58.8 per cent, the net surplus was increased from £5,273 to £8,400. Larger amounts were also assigned to the sinking fund, reserve fund for renawals, etc. It is hoped that the increase in fare, which was held back as long as possible, will enable the railway system to maintain its strong financial position in the face of higher operating costs and a possible reaction in post-war travel.

## Labor Indorses Technical Research

AT ITS Atlantic City convention just closed the American Federation of Labor adopted a resolution designed to encourage wider investigation of methods to promote better utilization of the nation's resources.

The preambles to the resolution recite that the productivity of industry is greatly increased by the technical application of the results of scientific research; that the health and well-being not only of the workers but of the whole population as well, are dependent upon advances in medicine and sanitation; that the increased productivity of industry resulting from scientific research is a most potent factor in the ever-increasing struggle of the workers to raise their standards of living; that there are numerous important and pressing problems of administration and regulation now faced by federal, state, and local governments, the wise solution of which depends upon scientific and technical research; and that the war has brought home to all the nations engaged in it the overwhelming importance of science and technology to national welfare.

The resolution follows:

*Resolved*, by the American Federation of Labor in convention assembled, that a broad program of scientific and technical research is of major importance to the national welfare and should be fostered in every way by the federal government, and that the activities of the government itself in such research should be adequately and generously supported in order that the work may be greatly strengthened and extended; and the secretary of the Federation is instructed to transmit copies of this resolution to the President of the United States, to the President *pro tempore* of the Senate, and to the Speaker of the House of Representatives.

# Safety Cars Increase Earnings 25 Per Cent in Terre Haute

**Thirty One-Man Cars Placed in Service in December Have Also Increased Car-Miles 25 per Cent, Reduced Accidents and Won Popular Favor**

A TYPICAL FLEET OF SAFETY CARS ON WABASH AVENUE

TERRE HAUTE, IND., is a city of 75,000 population. The local railway service is furnished by the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, which operates about 30 miles of city lines with forty passenger cars, exclusive of 78 miles of interurban lines and twelve interurban cars. The city equipment has included double-truck 20-ton cars and single-truck 12-ton cars, all operated by two men.

On June 10, 1918, thirty Birney standard one-man safety cars were ordered for delivery in October. This was said to be the largest order which to that date had been placed by any one city at one time for safety cars. A publicity campaign announcing these cars was begun about the middle of September, and among the points emphasized in the first "Talks" were the safety features of the cars, the more frequent and rapid service made possible by their installation and the necessity of having exact fare ready. The first series consisted of ten advertisements.

When the publicity campaign was begun it was expected that the cars would be delivered about the middle of October. Delivery, however, was delayed a month due to the effect at the factory of the influenza epidemic.

After the cars were delivered additional advertisements were run, explaining on which lines the cars would be placed and covering other details of the service and later thanking the public for its cooperation. Investigation showed that as a result 95 per cent of the passengers had the exact fare ready when boarding the cars.

There was formerly a specific ordinance in Terre Haute which required two men to operate a car. Through the efforts of the company this ordinance was repealed and another was passed permitting the operation of the Birney safety car with one operator.

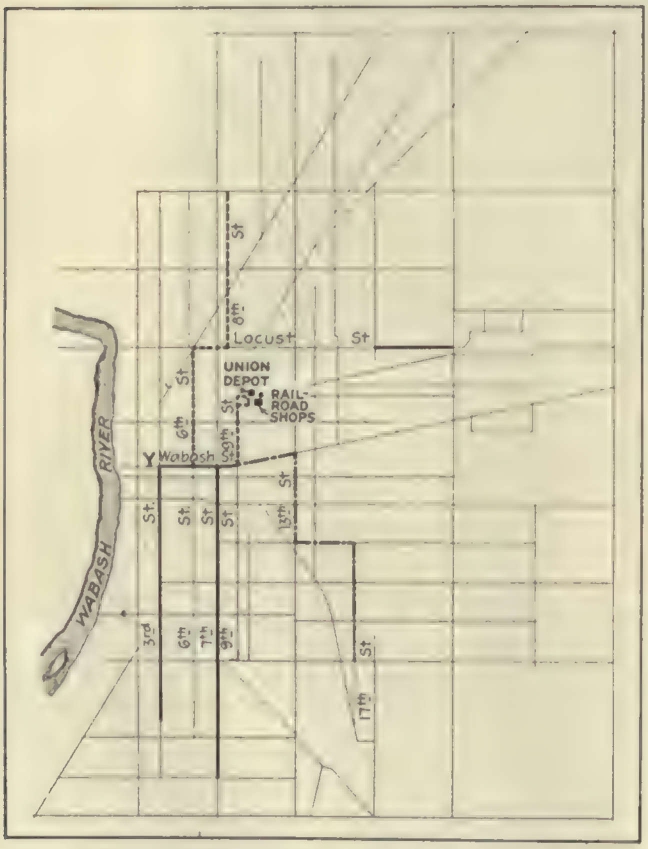
## CARS COMPLETELY EQUIP FOUR LINES, INCREASING SERVICE ON EACH

The first cars were placed in service on Sunday, Dec. 1, seven of them replacing seven two-man cars on the South Seventh Street-South Third Street line with three of the new cars held as extras to be used during the rush hours. The headway was cut from ten minutes to eight minutes, with a four-minute headway during rush hours. This line, which is shown by a heavy line on the accompanying map, is partly double and partly single track and has a round-trip mileage of 8.5. The cars operate north on Third Street from Grant to Wabash, east on Wabash to Seventh and south on Seventh to the Southern Indiana Railroad tracks, returning over the same route.

Ten days later six of the new cars were placed in service on the Eighth Street-Union Depot line, replacing five two-man cars and cutting the headway from ten to seven minutes. This is a double-track line with a round-trip mileage of 5.82. The route, as indicated by a dotted line on the map, is from Eighth and Maple south to Locust, west to Sixth, south to Wabash, east to Ninth, north to the Union Depot. Here the cars loop and return over the same route.

Five days later four cars were placed in service on the South Seventeenth Street line, replacing four two-man cars and maintaining a ten-minute schedule. This was then a single-track line but a passing track has now been installed at Franklin Street, and with the addition of two more cars a six-minute service was commenced on Memorial Day. This line has a round-trip mileage of 5.12 and, as shown by a dot and dash line on the map, operates from Hulman and Seventeenth Streets north to Crawford, west to Thirteenth, north to Wabash, west to the Court House at Third and Wabash. Here the cars "wye," returning over the same route. One car was also placed on a short stub line, ½ mile long, on east Locust Street on a ten-minute schedule. This is indicated on the map by a heavy line from Nineteenth to Twenty-fifth streets.

All of these lines, with the exception of the East Locust line, pass over Wabash Avenue, the main business street of the city. This gives a headway of less than one minute through the business district. Outside of the business district all of the lines pass through residence sections. Terre Haute has many industries; it is the center of the Indiana bituminous coal fields and is the home of steel mills, malleable casting plants, rolling mills and three glass bottle plants. These industries are all so scattered, however, that there is no industrial center and the safety-car lines serve both the industrial and the residence sections.



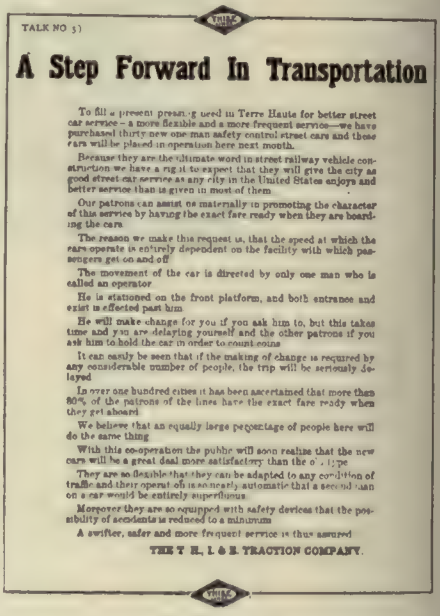
MAP OF STREET RAILWAY SYSTEM IN TERRE HAUTE SHOWING SAFETY CAR LINES

There are altogether six grade crossings in the city and the safety cars operate over three of them. Flagmen are stationed at each and, although on Wabash Avenue and North Sixth Street this is also a benefit to the two-man cars, the cost is all charged against the safety cars.

When the cars were first placed in service people made a great deal of fun of them, calling them various odd names reflecting on their size. The operation was successful from the beginning, however, in spite of the fact that the cars were placed in service just in time to catch the full brunt of the Christmas holiday rush. Special instruction sheets were issued to the men covering the operation of the new cars and no opposition was ever made to the one-man feature. In fact, the men are very well pleased with the cars, as they receive an increase in wages of five cents an hour when operating them. Men with seniority rights were given the first chance to pick the runs and they were required to make good. If they could not, other men replaced them. The first man to take out one of the new cars was the oldest motorman on the system, now in his thirtieth year as a motorman in Terre Haute, and he has never missed a day since.

The men not only like the extra $15 a month, but have been heard to state that they are not as tired at the end of the day after performing their dual service as formerly on the two-man cars. They say the cars ran more smoothly that the larger ones. Favorable comments have also been made by the press, and the local chamber of commerce has written to other chambers commending the cars and recommending their adoption in other cities.

The cars are of the standard Birney safety type, furnished by the American Car Company. The equipment includes two GE-258 motors, K-10 control, C-P-25 air compressors, friction bearing 78-M Brill trucks, Johnson single-dial fare boxes, and International 8-5 double clock registers. Three of the cars have also been equipped with Dayton air-operated register mechanism with most satisfactory results. The cars are double end and have a total weight of 13,200 lb. When first delivered they were not equipped with trolley stands, but some trouble was experienced at railroad crossings due to the higher overhead. Later, in order that they might be interchangeable among lines, all cars were equipped with 1-ft. trolley stands, the 14-ft. pole being retained. Each car is also equipped in each vestibule with a rack in which the operator inserts a card with his name printed in 2-in. letters. Above the rack are the words "Operator in Charge of This Car Is."



TALK NO 51

A Step Forward In Transportation

To fill a present pressing need in Terre Haute for better street car service – a more flexible and a more frequent service—we have purchased thirty new one man safety control street cars and these cars will be placed in operation here next month.

Because they are the ultimate word in street railway vehicle construction we have a right to expect that they will give the city as good street car service as any city in the United States enjoys and better service than is given in most of them

Our patrons can assist us materially in promoting the character of this service by having the exact fare ready when they are boarding the cars

The reason we make this request is, that the speed at which the cars operate is entirely dependent on the facility with which passengers get on and off

The movement of the car is directed by only one man who is called an operator

He is stationed on the front platform, and both entrance and exist is effected past him.

He will make change for you if you ask him to, but this takes time and you are delaying yourself and the other patrons if you ask him to hold the car in order to count coins

It can easily be seen that if the making of change is required by any considerable number of people, the trip will be seriously delayed

In over one hundred cities it has been ascertained that more than 80% of the patrons of the lines have the exact fare ready when they get aboard

We believe that an equally large percentage of people here will do the same thing

With this co-operation the public will soon realize that the new cars will be a great deal more satisfactory than the old type

They are so flexible that they can be adapted to any condition of traffic and their operation is so nearly automatic that a second man on a car would be entirely superfluous

Moreover they are so equipped with safety devices that the possibility of accidents is reduced to a minimum

A swifter, safer and more frequent service is thus assured

THE T. H., I. & E. TRACTION COMPANY.

ONE OF THE SERIES OF ADVERTISEMENTS ANNOUNCING THE NEW SERVICE

### 596,166 Car-Miles Without a Wheel Change

Up to June 1 the thirty cars had made a total of 596,166 car-miles. During this period of approximately six months of service, not one of the 24-in. chilled steel wheels had been changed, the average mileage per wheel being 19,872. Wheel-trueing brakeshoes are used on the cars when required. One explanation of the excellent wheel life is that Terre Haute is a very level city so that excessive braking is not necessary. There has been practically no motor nor truck trouble arising from internal causes and the air equipment has operated perfectly.

The service on the entire system as measured in car-miles has been increased 25 per cent, due entirely to the increased service given by the safety cars. As the lines equipped with safety cars represent 40 per cent of the total city mileage, the increase on these is correspondingly greater. There has been an increase in gross earnings of 25 per cent for the safety car lines, and an increase of 15 per cent for the entire city system, accompanied by a decrease in power consumption of 4 per cent, including four interurban lines operating twelve 54-ft. four-motor cars on an hourly schedule over the city tracks, together with freight and service cars within the city limits.

As an incident to the inauguration of safety car service, three Cheatham electric track switches were installed and others will soon be added. To operate the switches it is necessary to notch up to five points on the controller with the light cars, whereas two points are enough with the standard car. Until this was realized the operators experienced some trouble in working the switches and in some instances, upon failure to throw the switches at the customary two points, got out and threw them by hand.

Data so far available show a saving in maintenance of equipment of 2 cents a car-mile and in power of 1¾ cents a car-mile with the new cars. All of the savings together have enabled the company so far to continue existence on a 5-cent fare and no application for a higher fare has been made, although the city system is but half equipped with safety cars.

## AVERAGE ACCIDENT COST PER SAFETY CAR LESS THAN 13 PER CENT THAT OF OTHER TYPES

Up to the present time in articles on safety-car operation little has been said about accident data. The result of four months' operation (Jan. 1 to May 1) of twenty-three safety cars in Terre Haute has given some very interesting figures, as noted in the accompanying table:

ACCIDENT DATA T. H., I. & E. TR. CO.—TERRE HAUTE LINES, JAN. 1 TO MAY 1, 1919

ALL CITY CAR LINES
(Not including interurban cars)

Covers twenty-three safety cars and sixteen other types of cars, and includes all accidents, with cost of settlement of damages to vehicles and personal injuries.

| | Safety Cars | Other Type City Cars |
|---|---|---|
| Collisions, etc., in January | 28 | 20 |
| February | 21 | 21 |
| March | 22 | 13 |
| April | 25 | 12 |
| Total | 96 | 66 |
| Accidents involving expense | 21 | 15 |
| Total cost including repairs to street cars | $900.45 | $4,928.77 |
| Cost per accident | $9.38 | $74.63* |
| Car-mileage data: | | |
| Total car-miles, safety cars | 416,700 | |
| Total car-miles, other types | 348,200 | |
| Accidents per thousand car-miles, safety cars | 0.23 | |
| Accidents per thousand car-miles, other types | 0.19 | |
| Accident cost per thousand car-miles, safety cars | $2.16 | |
| Accident cost per thousand car-miles, other types | $14.15 | |

* Includes cost of personal injuries.

While the table shows a greater total of accidents with the safety cars than with other types, there were practically 50 per cent more safety cars in operation. The total cost of the accidents involving safety cars was about 13 per cent of that involving other cars, and the cost per accident and average cost per car operated were less less than 13 per cent.

Jitneys commenced operation in Terre Haute about four years ago, and at the time safety car service was inaugurated there were in regular daily operation between ninety and 100 jitneys. A few of the operators were "casuals" and "floaters," that is to say, men who had other occupations and owned or rented a Ford for the purpose of dropping in during rush-hour traffic and picking up a few nickels on the various lines. On two lines where the schedules have been increased, the jitney bus traffic has been greatly diminished, although it has not entirely disappeared. On the South Seventh Street line on the day safety-car operation was commenced, there were eighteen to twenty jitneys operating regularly. Gradually this number has been reduced, until since the first of the year there have been but four or five operating regularly, besides five or six more which drop in for an hour or two on the rush-hour traffic.

The territory tributary to the South Seventeenth Street line has been a fruitful field for the jitney bus, on account of the car service being on a ten-minute headway until May 30, when it was reduced to six minutes. It is confidently expected that the jitney bus traffic will be successfully combated on this line with the improved car service, although it is still too early to give any figures.

NINETY-FIVE PER CENT OF THEM HAD THEIR EXACT FARE READY THE FIRST WEEK

Jitney buses operated for a long time in Terre Haute without regulation, supervision or restraint and without protection of any sort to the traveling public. Early in 1918 a jitney ordinance was passed, which required the jitney buses to take out licenses and carry insurance. This ordinance was amended before its final passage so that the insurance feature was very mildly treated, in that instead of requiring a bond to be taken out in a standard old-line liability insurance company, a "mutual" bond was allowed in "Jitney Drivers' Mutual Insurance Company." Any protection provided by this kind of insurance arises from assessment of the various policyholders. Even under this municipal provision, many jitney buses are operating without either license or bond for limited periods each day, or on heavy traffic days.

The jitney-bus drivers have their own organization and naturally receive sympathy and support on this account from other organized trades, but E. M. Walker, general manager of the Terre Haute property, states his belief, based on his experience during the past six months, that the safety car is the successful competitor of the jitney bus.

Another by-product of safety-car operation has been found to be the absence of complaints from the public concerning inattention on the part of the operator, who is so comfortably and fully occupied that he has no time to be discourteous.

In replying to letters from other companies interested in the operation of safety cars, Mr. Walker has summed up what these cars on his property have accomplished as follows: Elimination of step accidents; reduction in accidents of a general nature, due to facility of handling cars; faster schedules with same number of cars; satisfaction of the people, both expressed by word and indicated by increased patronage; successful competition with the jitney bus, which had become an active contender for the business; satisfaction of the city government as evidenced by resquests for extension of safety car service; satisfaction on the part of the operators, on account of increased wage and easier riding cars; saving in power, permitting an increase in car-miles with a reduction in total power requirements; reduction in car maintenance expenses; evident reduction in track maintenance, due to the light weight of the cars.

As stated before, the fare in Terre Haute is 5 cents. However, for the benefit of the post office, telephone companies, etc., metal tokens are sold in quantities at 5 cents each. These are of the same size as the nickel and are recorded as such by the fare box.

# Indeterminate Franchise Is Most Equitable*

BY HALFORD ERICKSON
Hagenah & Erickson, Chicago, Ill.

THE kind of a franchise that now seems to be the most equitable to all concerned is the so-called indeterminate franchise or permit. Franchises of this kind are comparatively new. In only one state, Wisconsin, do they seem to have been in use long enough for even the semblance of a fair trial, and this discussion is largely confined to that state.

For nearly four years after the indeterminate permit had been provided in 1907 as a substitute for the ordinary utility franchise in Wisconsin, it was left optional with utilities to surrender their franchises and substitute the new grant, or to retain their existing franchises. In 1911, however, the Legislature decreed that all franchises coming under the provisions of the utility law of 1907 and not yet changed should become and have the same effect as indeterminate permits.

There are now two ways whereby an indeterminate permit can be secured: (1) By applying to the municipality for a grant to use the streets, etc., for the purpose of furnishing service where there is no utility occupying the field. This grant when exercised becomes by operation of law an indeterminate permit. (2) By securing a certificate of convenience and necessity from the Wisconsin Railroad Commission as authority to enter as a competitor a field already occupied by a utility furnishing similar service, and in addition to this by obtaining from the municipality such a permit to use the streets as the one just mentioned, which permit also becomes an indeterminate permit through the operation of law.

### PROTECTION AFFORDED TO PUBLIC AND UTILITIES

Among the factors which tend to protect the public and to promote its convenience and welfare, the following may be mentioned:

1. The public is entitled to adequate service at reasonable rates that are free from unjust discriminations.
2. Since the municipality has the power to grant or withhold the use of its streets and highways for public utility purposes, it may also, where no utility exists and where a certificate of public convenience and necessity has been granted, either reject or accept applications for such use; and through the exercise of this power it is in position largely to control the situation.
3. The municipality has been granted the power to acquire at a fair price the property and business of the utilities by which it is served and can exercise this power and enter the public utility business whenever it chooses to do so, or whenever it becomes dissatisfied with the service, the rates or any other conditions.
4. Whenever public convenience and necessity demand it, the municipality or some other utility can obtain authority to enter the field and to furnish service in competition with the existing utility.

Among the factors which tend to increase the safety of the investment and promote fair treatment to the enterprises are the following:

1. The utilities for adequate service are entitled to rates that are reasonable under the circumstances.
2. The utilities are entitled to fair prices for the property that is used for the convenience of the public when it is taken over by the municipalities.
3. Except where active competition existed when the public utility and indeterminate permit laws went into effect, the utilities are entitled to the exclusive right to furnish the service until the property is taken over by the municipalities or until for good reasons competitors are authorized to enter the field.
4. Public utilities are entitled to have all investments made for the benefit of the public kept intact through proper charges made for the service rendered.

In connection with the factors just explained, consideration should also be given to the following propositions:

1. What constitutes adequate service is determined by standards and rules developed through careful investigations and wide experience. Such standards and rules are enforced by regular inspections and by other methods and proceedings.
2. Reasonable rates under normal conditions are made up of charges that are high enough to cover the operating expenses, including depreciation, and interest and profit on the fair value of the property and business involved.
3. In determining the fair value of the plants and their business consideration when possible is given not only to the cost of reproduction but also to the original cost of such plant and business together with other factors that may affect the value.
4. The power to authorize a competitor to enter the field under a certificate of convenience and necessity is exercised with the greatest care and with the most scrupulous regard for all the interests that are affected. Such certificates are not granted until it has been clearly established that public convenience and necessity demand such action. In passing upon such matters the commission is controlled by the utility's inability or unwillingness to render adequate service and other questions that vitally affect the public welfare rather than local frictions, political interests and untried and uncertain governmental experiments. The burden of proving that such competition is necessary and to the best interest of the public is also largely upon those who make such application. In addition to this the merits of such applications are carefully inquired into by the commission. With the adequate power which the commission has, not only for ascertaining the true situation but for compelling the existing utilities to furnish adequate service and to carry on their businesss so as to promote the

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*Abstract of address presented before public utilities committee of Chamber of Commerce of the United States in Washington, D. C., May 29, 1919.

general welfare, it is clear that it is not often necessary to grant such application.

5. The power to permit competition when needed is regarded as of almost as great importance as the power to revoke franchises, a power that rests exclusively in the Legislature. It is also a fact that such competition, if authorized, would under the circumstances be almost certain to spell ruin to the existing utility. When the existing utility, however, can be made to serve the public as well and at as low cost as any service of the kind that could be obtained from any other source, then it would manifestly be an injustice as well as a waste of capital and efforts to authorize competition. The power to authorize competition, however, has a considerable amount of value as a regulative force.

In conclusion, the indeterminate form of franchise affords more protection to both the public and the utilities than any of the kinds by which it was preceded. Whether the indeterminate permit would work as well in the absence of public utility laws and commissions as in connection with such laws is not entirely clear. It may also be a question whether such permits could be adopted in some states without far-reaching changes in their legal systems. But as most of the states now have so-called public utility laws and commissions these obstacles are probably not serious.

### THE GENERAL SITUATION DEMANDS RELIEF

In addition to the foregoing remarks the general electric railway situation may be summarized in part as follows:

The electric railway situation is one for which adequate remedies should be found and properly applied. How can it best be met? About the only remedies that can be suggested is an increase in the rate of fare for passenger transportation wherever needed, and the elimination of all expenses and charges except such as are necessary for adequate service. In such cases the customary flat 5-cent fare will either have to be raised to a higher figure or restricted to shorter rides or to smaller areas or zones with an additional and lower rate for each succeeding zone. As to which of these methods should be chosen is a matter that would largely seem to depend upon the conditions of each particular place.

A flat rate of say 5 cents, or any other given sum, is not always desirable. This is especially true in the larger cities with long rides or lines. In such cities a flat rate causes the short distance rider to pay more than his share and the long distance rider to pay less than his share. For this and other reasons such flat rates also tends to discourage or reduce the short haul traffic and thereby to decrease the traffic density of the railway system. Flat rates therefore, are not only likely to be inequitable as between long and short haul riders, but by reducing the density of the traffic they also tend to keep the earnings down and the cost of operation per unit of traffic high.

Flat rates appear to be equitable in the smaller cities where the lines are comparatively short, and inequitable, as well as discouraging to certain parts of the traffic, in the larger cities where the lines and the hauls are comparatively long. These objections, on the other hand, do not seem to hold as against rates in the makeup of which due consideration is given to those expenses which do not vary with the length of the haul as well as to that part of the total expense which vary with the length of the haul. Rates in which distance is thus a factor are sometimes called zone rates and at other times again distance or mileage rates. Rates of this kind can mostly be so adjusted that both the short-haul and the long-haul rider are made to bear their just share of the total cost. They can also be so applied as to bring in the maximum amount of traffic.

### JUSTICE IN ZONE RATES

It is of course a fact that in order to base zone rates on costs many complicated apportionments of the expenses and many distributions of the apportioned items are necessary. The fixed expenses which are largely independent on the length of the haul must be separated from the variable expenses which depend upon or vary with the length of the haul. The fixed expenses in turn must be distributed on the total passengers handled. The variable expenses must be allotted to the passengers somewhat in proportion to the length of their ride. In the latter distribution the total variable expenses, the total car mileage, the average number of revenue passengers per car-mile and the length of the zone are important factors. While these distributions when taken together are complicated, experience has demonstrated that they are practicable and of the greatest help in determining rates of fare that are just and fair to all.

Nor can it justly be said that zone rates are so difficult in application as to be impracticable for this reason. While such rates have not as yet been generally applied, enough experience has been had under them to show that they can be used without causing either passengers or employees any undue inconvenience. Through mechanical devices for checking or counting and proper rules for entering and leaving cars in addition to a little watchfulness, it is easily possible fairly and economically to administer a zone rate system. While it is true that zone rates are not as convenient in everyday use as flat rates, it is also a fact that in larger cities this disadvantage is more than offset by several important advantages.

### CONGESTION IS NOT AN OBSTACLE

It has also been said that zone rates tend to retard the growth of suburban districts and to cause congestion of population and are therefore undesirable. It is very doubtful whether this objection should be given a great deal of weight. Experience shows that the distribution of the population in the larger cities is chiefly affected by such conditions as rents, character of the population, time consumed in going and coming, the standard of living and other causes of this nature. It is of course possible that under zone rates the small additional charges beyond the first zone might also contribute a little toward undue congestion, but it is hardly probable. At any rate it would be of much less importance in this respect than the causes just mentioned. On the other hand, there are also in the zone rates certain offsetting elements. If under such rates, for instance, the roads can be more easily placed in a sound financial position than under the flat-rate system, it would also follow that the roads could be more easily and quickly made to extend into new suburbs than would otherwise be the case. As such suburbs, when connected with the city by proper transportation service, usually tend to relieve congestion in the city, this is a matter of much importance.

Public utilities, including electric railways, are entitled, under normal conditions, to rates that will yield reasonable returns for the operating expenses including taxes, depreciation, and interest and profit on the fair value of the investment. The price for capital varies somewhat with the risks involved and with other conditions, but it is the price that must be paid if the capital is to be had. For several years up to the beginning of the war capital in the public utility field could not as a rule be had on normal income bases unless such utilities were earning about 8 per cent for interest and profit on the fair value of the plant and the business. During the war this rate has, of course, been much higher, but it is not unlikely that, when normal conditions have been established, the price of capital in this field may return to some such a figure as that just mentioned.

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## Resuscitation from Electric Shock

THE ELECTRIC RAILWAY JOURNAL publishes as a supplement with this issue a chart giving instructions for resuscitation from electric shock by the prone pressure method as recommended by the National Electric Light Association. The chart is an abbreviation of the booklet of rules for resuscitation from electric shock, as revised by the association and presented at the recent Atlantic City convention by the committee on safety rules and accident prevention, of which W. C. L. Eglin is chairman. In commenting on these rules Mr. Eglin called attention to the work, in 1911, of the prior committee on this subject. He then said, in part:

"The revision of the rules and also the chart, which consists of an abbreviated form of these rules, has been based on field experience covering a number of years; and while no very radical changes have resulted, changes in detail have been made which, it is felt, will make the operation of the method more effective, and to which the careful attention of instructors and those familiar with the method is directed."

# Steam Railroad Master Mechanics Meet

## The Second Part of the Atlantic City Convention of Section III, American Railroad Association, Was Devoted to the Field Covered by the Former American Master Mechanics' Association

CONTINUING the report, begun in last week's issue, of the record-breaking meeting of the men of the mechanical departments of the steam railroads, held at Atlantic City, June 18 to 25 inclusive, the following digest contains items of general and electric railway interest.

### HEATING OF PASSENGER TRAINS DRAWN BY ELECTRIC LOCOMOTIVES

The report of the committee on design, maintenance and operation of electric rolling stock was devoted entirely to the heating of passenger trains drawn by electric locomotives.

The report traced the history of experiments, first with oil-fired boilers, next with electric boilers and finally with oil-fired boilers again. The early oil-fired boilers were abandoned on account of accumulation of carbon on the tubes, of trouble with back drafts and of difficulty in regulating the supply of oil and water. The electric boilers were found to be expensive to build and maintain.

After tests on improved types of oil-fired burners the type described in the issue of the ELECTRIC RAILWAY JOURNAL for June 10, 1916, page 1080, was developed. This was applied to twenty-nine locomotives. It is 39 in. in diameter, has 1380 copper flues 30 in. long and ½ in. in diameter, 436 sq.ft. of heating surface, a working pressure of 110 lb. per square inch and a capacity of 2200 lb. per hour. Improvements over earlier types consisted among others of the use of a water leg 18 in. deep and 2½ in. wide; increasing the bridges between the tubes to ⅜ in.; substitution of a forced draft in the firebox with a closed door for the natural draft used previously, and the use of two expansion joints of the bellows type in the boiler shell.

The fuel-oil burner used is very simple, very easily cleaned and adapted to eastern fuel oil, which has a paraffine base, or kerosene. The lower section of the burner, which carries the steam or air for atomizing the oil, projects beyond the oil orifice, forming a lip or shelf on which the excess oil may flow and still be atomized. Where it is more economical to use the heavy western oils having an asphalt base, it has been found necessary to leave off the lip, because of the liability of oil accumulating at that point and interfering with the steam jet, as shown by the experience of the Chicago, Milwaukee & St. Paul. Only when the boiler is started is air from the main air reservoir turned into the stack blower to insure a draft and onto the burner to atomize the fuel oil. As soon as there is a steam pressure approximating 50 lb. a three-way cock is used to substitute steam for compressed air. That only a very short time is required to obtain steam for this change is obvious when it is realized that with cold water in the boiler it requires only four minutes to develop a steam pressure of 10 lb. and ten minutes from starting the fire a steam pressure of 110 lb. is obtained.

Carefully checked recent tests have shown that the raising of the breeching, or smoke box, above the top flue sheet from its original height of 1½ in. to 10½ in. has resulted in increasing the steam capacity of these boilers 32.2 per cent. This is undoubtedly due to the fact that there is now a free exit for the gases from the outer tubes, which in effect increases the heating surface of the boiler, the products of combustion passing through these outer tubes having previously been choked by the limited area through which the gases from these flues could escape.

Particular attention is called to the fact that there is a superheater in connection with the boiler. It is possible to obtain any reasonable degree of superheat required. Good practice indicates that about 15 degrees is desirable, as a high superheat damages the steam hose and gaskets. Tests show that when the steam is somewhat superheated it requires less steam per car per hour to heat it satisfactorily.

The type of boiler just described is standard for the electric passenger locomotives on the New York Central, where its capacity is rated at 2200 lb. of steam per hour; on the Chicago, Milwaukee & St. Paul, where it is rated at 2600 lb. of steam per hour; on the New York, New Haven & Hartford, where the maximum capacity is given as 2700 lb. and an average of 2200 lb. per hour. It has been adopted for the electrified zone of the Canadian Northern Railway, where the heating plant is installed in a separate car, or trailer, instead of on the locomotive. Each of the railroads reports satisfactory results from these boilers. In each case the cars are heated from a steam header at terminals before the engines are attached, or are delivered, properly heated, by the steam locomotives to the electric engines. On the Chicago, Milwaukee & St. Paul the outside temperature is occasionally 40 deg. below zero, and the heating plant "appears fully to meet the requirements for the heating of the trains in the coldest weather." The New York, New Haven & Hartford Railroad reports that "in normal winter weather, on trains of nine cars or less, only one boiler is used, but with cold weather and longer trains we find it better to use two boilers, one for each locomotive."

### AMOUNT OF STEAM NECESSARY

The heating plant should be designed to develop the amount of steam required by the most severe conditions, and there are a number of conditions which influence the requirements. Among others are the following: The temperature of the outside air; the severity and direction of the prevailing winds; the number of cars in the train; the amount of radiating surface of the steam pipes; the cubical contents of the cars; the ventilating system used in the cars; the presence or absence of double sash; the materials of which the cars are built, whether wood or steel, for instance; the efficiency of the heat insulation, especially in the case of steel cars, including, particularly, the steam line under and between the cars; the steam control on the cars, whether hand or automatic.

As far as the committee was able to determine, there are no data as to the amount of steam needed to satisfactorily heat passenger cars which can be generally applied. The results are usually given in pounds of steam per car per hour for various outside temperatures, without detailed information as to car dimensions, construction, ventilation or heating system. Under these circumstances the records are of no practical value except locally.

### COMPARISON OF OIL AND ELECTRICITY

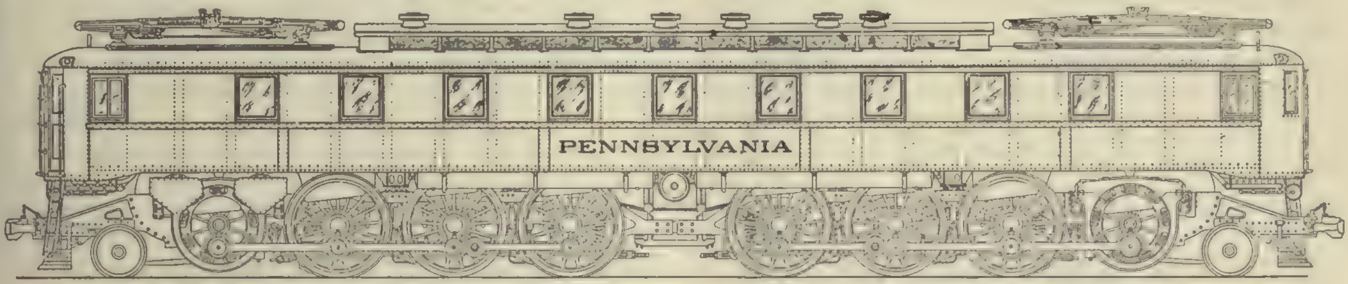
So far as the committee is informed, no practical steam boiler has yet been developed which uses electricity as a source of heat. Assuming that such a heating plant is available, there are certain facts which should be borne in mind. The cost of electricity to produce a given amount of steam is from six to ten times that of fuel oil, omitting the item of fixed charges in the cost of current. The ratio depends on the relative cost of fuels. If the peak load for propulsion and heating current come at the same time, during the Christmas holidays, for instance, it will be necessary to increase the power station and substation capacity, not only increasing the capital invested, but incurring additional fixed charges which continue during the whole year though the additional apparatus is required for only a few months, during the heating season. Estimates made a few years ago showed that electrically generated steam would cost about $45,000 a year more than from oil-fired boilers, the number of locomotives involved being less than 35, not including fixed charges in the cost of current. If fixed charges are included, there would be in this case a saving of over $100,000 a season in favor of oil as a source of heat.

There is undoubtedly an element of danger of fire in the use of fuel oil or kerosene. This was greater in the earlier designs of heating plants, when the oil was under air pressure, than with later designs, which feed the oil by gravity. Care in design, construction and operation have shown the hazard is small.

The experience with the electric steam boilers has been so very limited, that there are practically no facts on which to base an opinion as to the liability of fire and personal injury in their use. That there is an element of danger there can be no doubt. There are, however, certain conditions, such as long tunnels, which make the electrically heated steam boiler very desirable and in all probability will result in a successful design.

The report abstracted above was signed by C. H. Quereau, superintendent electrical equipment, New York Central Railroad, Chairman; G. C. Bishop, superintendent motive power Long Island Railroad; J. H. Davis, electrical engineer Baltimore & Ohio Railroad; George McCormick, general superintendent motive power Southern Pacific Railroad; H. R. Warnock, general superintendent motive power Chicago, Milwaukee & St. Paul Railway; W. L. Bean, mechanical assistant to federal manager New York, New Haven & Hartford railroad; J. T. Wallis, general superintendent motive power Pennsylvania Railroad; J. E. Pilcher, mechanical engineer Norfolk & Western Railway; A. C. Deverill, superintendent motive power Great Northern Railway.

In connection with the meetings there were many matters of interest and importance aside from the technical programs. For example on the evening of June 21 speakers of countrywide renown paid tribute to the railroad men who had participated in the war activities. To quote the New York *Times*: "The spokesmen for a thankful nation were Franklin D. Roosevelt, Assistant Secretary of the Navy, speaking for both the Army and the Navy Departments; United States Senator Walter E. Edge of New Jersey, and Colonel Henry W. Hodge, who was Assistant Director of Transportation in France for the American Expeditionary Force.



ELEVATION OF SINGLE-PHASE, THREE-PHASE LOCOMOTIVE EXHIBITED BY PENNSYLVANIA RAILROAD AT ATLANTIC CITY CONVENTION

"The occasion was a recognition night rally under the direction of the mechanical sections of the American Railway Association, and master car builders, superintendents of motive power and other executives of the big trunk lines now comprising the federalized railway system of the United States crowded the hippodrome of the Million Dollar Pier and cheered every reference to General W. W. Atterbury and other transportation specialists who made history when America crossed the Atlantic."

On the evening of June 23 a lecture was given by Major E. D. Campbell, Artillery Division, Ordnance Department, United States Army, on "Railway Artillery". This lecture was a fit accompaniment to the exhibits of artillery of this type referred to in part in last week's issue.

### MEETINGS OF RELATED ASSOCIATIONS

During the convention a number of meetings of related associations were held. Among these was the first meeting of the executive committee of the reorganized American Railroad Association. R. H. Aishton, regional director Northwestern Region was elected president, J. E. Fairbanks was re-elected general secretary and treasurer, and other offices were filled as well. The date Jan. 21, 1920, was set for the next meeting of the association.

The railroad Supply Men's Association also met and elected officers. George R. Carr, Dearborn Chemical Company, Chicago, Ill., was elected president, J. F. Schurch Rochester, N. Y., vice-president, and J. D. Conway of Pittsburgh, secretary-treasurer. New executive committeemen are W. H. S. Bateman, Philadelphia; John M. Gillespie, Pittsburgh; C. D. Jenks, Cleveland; L. S. Wright, Chicago; Colonel George L. Morton, Atlanta.

The Association of Railway Electrical Engineers also met in semi-annual convention for the informal discussion of pressing problems. Particular attention was given to the report of the committee on locomotive headlights, based upon a general questionnaire. The work of the committee of illumination also came in for consideration, as did that of the committees on electric arc welding and electrification. The latter, presented by E. Wanamaker, Rock Island Lines, showed that there is an increasing interest being taken by railroad managements in electrification projects. The committee desires information in its field for the benefit of those roads which are logically interested in electric traction.

Brief reference was made last week to the powerful electric locomotive exhibited by the Pennsylvania Railroad. This has been developed for use on the Altoona Division of the main line of the railroad in West Central Pennsylvania. It is claimed to be the most powerful locomotive ever built, having a rating of 4800 hp. normal rating, and being capable of exerting 7600 hp. during acceleration. A photograph of the machine was reproduced last week. A side elevation accompanies this article. The locomotive was described in detail in the issues of this paper for June 9, 1917, page 1048, and Oct. 6, 1917, page 619.

## Why Not Apply the Safety Car to Interurban Service?

### The Frequent-Service Feature Would Be Appreciated and the Operating Economies Would Affect the Balance Sheet Favorably

By D. C. Hershberger

General Engineering Department, Westinghouse Electric & Manufacturing Company

THE wonderful success of the quick-service safety car on city streets, in all parts of the country, demonstrates that it would also solve some interurban or surburban problems. It is capable of performing the present schedules on many low-speed lines, where old types of cars are now operating. It will also be capable of performing the necessary service on lines which at present have medium schedule speeds, provided the running time is increased and a greater number of cars put into operation in order either to maintain the present headway, or to reduce it if the traffic warrants. On some roads this will necessitate the changing of the present passing points on single-track lines, while in other cases additional passing points will be required.

Where relatively heavy cars are now used on lines having limited feeder capacity, the voltage at the car is usually low, which interferes with the operation of the present heavy cars. With the safety cars the power peak, as well as the average current on the line, is reduced to such an extent that a much higher average voltage will obtain. This improvement in voltage will aid the safety car in maintaining present schedules.

On some interurban lines the tide of traffic in a given direction is heavy for short periods, which may be in excess of the capacity of present safety cars if operated singly. To meet this condition these cars can be operated with two or more running on the same block on the heavy trips. In other cases, some of the old cars, operated as trippers, may be used for the peak load.

The safety car is capable of maintaining a reasonable schedule, and if the track is in good condition is practically free from pitching and rolling. As its weight is only one-third or one-fourth that of the interurban car which it would supersede, the car would obviously involve less expense for track maintenance or, conversely, with the same maintenance expenditure, the track could be kept in much better condition so that the safety car would actually have better riding characteristics than the old heavy cars operating on poorly maintained tracks.

The public which patronizes interurban or suburban lines prefers neat, well-maintained and well-operated cars, even though they may be small, to old "ramshackle," weather-beaten, noisy cars. The latter have a depressing effect on the car rider and encourage adverse criticism.

A few interurban and many suburban lines are equipped with longitudinal-seat cars. Such cars are less pleasing to the public than cross-seat cars like those of the safety type. Proof of this is seen in the fact that in cars having longitudinal seats along one side and cross-seats on the other, the cross-seats are always filled first.

The interurban transportation field presents an opportunity for a new type of one-man safety car. There are many lines which could be better served by a light four-motor, double-truck safety car with greater seating capacity, and geared for higher speed than the present safety cars. A car of this type, equipped with safety appliances, can be as easily and safely operated by one man as on the present safety cars now in use on city and suburban lines.

As the operator has the entire responsibility for safe transportation of his passengers he will be less careless in observing operating rules and signals, and in handling the public, than would either the motorman or the conductor were the responsibility divided between them. On interurban roads the duration of stops for receiving and discharging passengers is relatively small as compared with the total time between terminals; in fact it is much less than on city lines. Hence the question of stand-still time to permit boarding and alighting would not interfere with the service, as the public would become habituated to having the proper fare ready when boarding.

The question of fare collection is, of course, one of the first that comes to the mind of the transportation superintendent. On steam roads the patron would not think of tendering fares by zones for the reason that the railroads have never inaugurated this practice. The same is true with a large number of interurbans. Where zone systems are employed it would obviously be necessary to revise the present methods.

On many of the roads, where the two classes of safety cars referred to above could be operated, the crews know most of the patrons, and furthermore know their habits with respect to boarding and leaving the car. Thus it should be easy for safety-car operators to collect the fare for a whole ride at the time the passenger boards the car. However there are many places where this method of fare collection could not be employed due to franchise and other restrictions. In these cases other methods can be employed to advantage.

The application of safety cars to interurban service would meet with difficulties, but with tact and perseverance these can be overcome.

# Iowa Association Holds Two-Day Meeting

**Joint Session with Iowa Section of the N. E. L. A. Was Included—Discussion Was Intensely Practical and Timely—J. P. Ingle Was Elected President**

AS NOTED briefly in last week's issue of this paper, the Iowa Electric Railway Association met at the Colfax Hotel, Colfax, on June 18 and 19. The afternoon session on June 18 was held jointly with the Iowa section of the National Electric Light Association. Papers were read by William Chamberlain, general counsel United Light & Railways Company, on "Rate Litigation in Iowa," and by Dean William G. Raymond, University of Iowa, on "The Iowa State Board of Conciliation — Its Work and Possibilities." An abstract of the latter appears elsewhere, and one of the former will follow. On the evening of that day an impromptu dance was held.

The morning of June 19 was devoted largely to routine business. In the absence of C. E. Fahrney, president of the association, Vice-President F. J. Hanlon presided. A general discussion on paving completed this session.

During the afternoon of June 19 papers were read by T. C. Roderick, assistant general manager Tri-City Railway, on "The Safety Car," and by C. W. Place, engineer General Electric Company, on "The Automatic Control of Substations." These will be abstracted in a later issue of the JOURNAL.

These papers were generally discussed and the discussion finally turned on the subject of track reclamation by welding and grinding.

Before the meeting closed Secretary H. E. Weeks called attention to the paucity of railway representatives at the meeting. After discussion it was decided to appoint a committee to draft a plan to increase attendance at, and interest in, the meetings. The following were appointed:

J. P. Ingle, Keokuk Electric Company, chairman; B. J. Denman, Tri-City Railway & Light Company; R. A. Leussler, Omaha & Council Bluffs Street Railway; W. H. Brooks, Westinghouse Electric & Manufacturing Company, and A. P. Jenks, General Electric Company. At the executive session following the general meeting officers were elected for the ensuing year as follows: President, J. P. Ingle; vice-president, F. J. Hanlon; secretary-treasurer, H. E. Weeks, and member of the board of directors for five years, J. P. Ingle.

The convention concluded with a banquet and dance attended by 150 or more delegates and guests of the two associations. After dinner the associations were welcomed to Colfax by the secretary of the Commercial Club who, with the Mayor, represented the city at the banquet. The main speaker was John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, Ill., who spoke on "Public Utility Regulation."

## WEDNESDAY PAPERS FAVORED RATE LITIGATION

The paper read at the joint session on Wednesday by Mr. Chamberlain was considered so important to the members that the association plans to publish it in full in pamphlet form. In the discussion of the paper a question brought from Mr. Chamberlain the statement that the acceptance of a franchise does constitute a contract but that such acceptance does not constitute the acceptance of the franchise ordinance in which, and not in the franchise or lease, the rates are specified. In answer to another question Mr. Chamberlain replied that the decision of Judge Applegate, as referred to in the paper, does not affect railway properties unless they come to be included in the statutes covering general conveyances, a decision in regard to which has never been rendered. It was further brought out that a franchise voted upon by the public does not become any more of a contract than otherwise as the public merely signifies its approval of the action of the council.

An interesting point in the discussion of the paper by Dean Raymond was the statement by him that the method used by the board in determining the going value of a utility was to estimate the annual cost of operation of the property, to add a percentage—say 10 per cent—and to capitalize this at say 7 per cent. The result was assumed to be the going value. The discussion brought forth complimentary references to the fairness of the board, and to the influence that its decisions have had on the councils of cities whose controversies were not under consideration.

## BRICK IS FIRST CHOICE IN PAVING

The general discussion on the best paving to be used in connection with street car tracks, with special reference to the advantages of cement, creosote blocks, brick and asphalt, was led by R. J. Smith, superintendent way and structures Tri-City Railway. Mr. Smith said that his experience with creosote block and asphalt had been unfortunate and that he considered asphalt a failure in track paving. In fact, in general, any monolithic pavement should be avoided. Concrete, preferably reinforced, may serve for temporary construction where traffic is light Creosote block makes an excellent pavement as far as the paving itself is concerned provided the blocks are perfectly treated and perfectly laid, both operations under rigid inspection. They should be laid on the green concrete, thus eliminating a grout cushion, and the joints filled with grout.

The standard on his property, said Mr. Smith, is a brick pavement laid in a 1: 4 mix grout cushion which is, in turn, placed on the green concrete foundation. The paving joints are filled with grout and no provision is made for expansion. With a bituminous filler the bricks wear at the edges, resulting in "turtle backs." For extremely heavy traffic granite or sand stone blocks on a grout cushion should be used in place of brick. The railway should not be required to put down a fine twenty-year pavement every time paving is done when grade or other changes may be required in a few years.

In the discussion which followed Mr. Smith's remarks O. H. Simonds said that his experience with creosote blocks had been unfortunate; that they were generally spaced too close together and that in replacing or repairing pavement on his property the space was being increased to ¼ in. A mortar cushion with a grout filler is used. Mr. Simonds also prefers the brick pavement from the standpoint of economy.

Speaking of filler blocks Mr. Smith said even with the best construction the rail will vibrate and therefore the pavement should be kept vertically separate from the rail. Of course this allows water to seep in but if the web space of the rail is filled with mortar the seepage will not be serious. Anyway brick cannot be laid under the head of the rail satisfactorily. T-rail construction is the best, with the brick arched at the center of the track and brought down to the head on the rail and the web space filled with grout. J. P. Ingle, E. C. Allen and J. O. Schulze agreed with Mr. Smith in his conviction that brick gives the best pavement and that concrete and creosote blocks are unsatisfactory.

Referring to paving around special work Mr. Smith said that he is using brick, but still experimentally. Perfect special-work construction does not offer any difficulties in paving, but no railway lays perfect special work and constant maintenance is necessary. T. C. Roderick stated that brick gives the most satisfactory results, wood block is very unsatisfactory and asphalt is fairly satisfactory if brick is used against the rail. Nose blocks have not proved satisfactory but where it has been necessary to use them a specially-designed granite block has given the best results. Water-bound macadam makes a fairly satisfactory cheap pavement for very light traffic, but needs constant maintenance although this is not costly. Special work with sharp-angle frogs has been paved with granite blocks cut to fit.

### SAFETY CAR A LIVE SUBJECT

Mr. Roderick's paper brought out the most extended discussion of all those presented. In the course of this F. J. Hanlon said that he did not believe that there is a property in Iowa that can afford to operate cars with two men. The one-man car insures faster schedules, and on his property faster loading and unloading are actually obtained. The fare box is equipment essential to the safety car, and passengers will have the correct fare ready. Otherwise caustic remarks about delaying traffic are made by other passengers. With a 9-ft. wheel base the riding qualities of the car are better than those of a double-truck car. Mr. Hanlon did not favor the use of ball bearings.

Some discussion ensued on the necessity for an overhead register and E. C. Allen stated that this is not necessary, that it will never check with the fare box until the men make it do so at the end of the trip. Mr. Allen said that his experience indicates that 95 per cent of the passengers have the exact fare ready. If half-fare and other tickets are in use a register would seem to be necessary. Mr. Hanlon said that his safety cars are equipped with Economy meters and that in spite of a 25 per cent increase in the unit cost of power at the plant the cost of power consumed has been considerably reduced.

Where the standard safety car has been installed an average annual saving of $3,500 per car, including power consumption, platform expense and maintenance, has resulted, according to Nic LeGrand, National Safety Car & Equipment Company. In every case the gross receipts have increased from 12 to 55 per cent. One big feature in favor of the car is the absolute elimination of platform accidents. The loss of fares is also practically eliminated because the men are kept too busy to "knock them down." Mr. LeGrand thinks it desirable that the cars be kept standard and believes that faster loading and unloading will result with a 30-in. door opening than with a wider one. Local conditions can be adjusted to the car better than the car to local conditions, said W. H. Brooks. The cars should be kept standard. W. H. Beattys, Westinghouse Traction Brake Company, explained the safety features of the car such as the "dead man's" handle and foot pedal, the operation of the brakes, sanders and doors, and said that there is nothing else that will give to the railway companies a return on the investment such as is given by the safety car. J. P. Ingle said that three

GROUP OF DELEGATES AT CONVENTION OF IOWA ELECTRIC RAILWAY ASSOCIATION years ago Stone & Webster standardized on the Birney car and that since that time nothing else had been purchased. The only thing the local manager can specify is the number of the car, the color and the destination sign. No property, he said, has a right to ask for an increase in fares until every known saving had been instituted and that means the safety car.

### THE AUTOMATIC SUBSTATION ANOTHER IMPORTANT DEVELOPMENT

In the discussion which followed the reading of Mr. Place's paper John M. Drabelle, electrical engineer Iowa Railway & Light Company, said that manufacturers must substitute for the highly refined switchboard relay a more substantial equipment. A little trouble has occurred at the relay on his property but the first year of operation has been very satisfactory. The automatic hydraulic station has in two years developed 6,000,000 kw.-hr. of energy at a maintenance cost of $42.88. C. A. Butcher, Westinghouse Electric & Manufacturing Company, said that he believes that automatic substations will in the future be installed more rapidly than the manual stations. He emphasized the necessity for intelligent inspection. A. P. Jenks said that the automatic substation is not in the experimental stage. The first installation was made several years ago and although of course a few "bugs" have developed the equipment has proved very successful and most reliable. The automatic substation and the safety car go hand-in-hand in relieving the street railway situation. Both are labor-saving devices and this is important as the eight-hour day is coming and manual stations which now operate on two shifts will have to change to three.

D IOWA SECTION OF NATIONAL ELECTRIC LIGHT ASSOCIATION AT COLFAX, IA.

The general discussion on reclaiming track and special work by welding and grinding was led by R. J. Smith who said that he was convinced the work pays richly. The welding process is as uncertain as any process in the industry, he said, in spite of the fact that the progress of the art has eliminated much of the uncertainty and will eliminate more. The work should be handled by a separate department. That in Davenport has included building up and grinding old track, bolted special work and manganese centers, putting on welded plates and other special jobs. The arc welded joint is a success but indifferent success has been obtained with welding of special work and manganese centers. With manganese it is somewhat of a hit-and-miss process, as the manganese loses some of its properties when heated.

The foundation upon which the work has been done should be borne in mind in considering any welding failures. Mr. Smith said that as the efficiency of resistance machines is low, it may pay to have more generator sets and fewer resistance machines. The importance of having the work clean before welding was emphasized. Every property, even though small, should have a welder and a grinder. In answer to a question Mr. Smith said that there is no bad effect upon the weld as a result of doing the work under traffic, but if the traffic is heavy it will be better to do the work at night and not delay schedules.

All mechanical joints are being replaced with welded joints on his property, said O. H. Simonds, and the work is being done at night. Grinding is a part of the welding operation and should always follow the building up of joints. It is also a good plan to grind joints on new track before any traffic has passed over them.

## Germany Electrifying Suburban Lines

The *Electrician*, London, states that Berlin is now falling into line with other large cities in adopting electrification for its network of suburban railways, one section of which has been commenced. The trains are to be composed of twelve coaches each with a double-axle driving truck at each end. The system is so arranged that existing coaches can readily be adapted to it. It is proposed to divide the trains into two portions, each working independently, which will facilitate economical working during the light traffic period.

# Iowa State Board of Conciliation

## Its Origin, Work and Possibilities Are Described by One of the Members of the Board

By WILLIAM G. RAYMOND
Dean of Engineering Department, State University of Iowa

THE creation of the Iowa Board of Conciliation was unique in the history of public utility rate settlements. In the early summer of 1918, Hon. Martin J. Wade, Judge in the United States District Court for the Southern District of Iowa, found that his court was about to be swamped with actions brought to secure increases in municipal public utility rates. These actions were growing out of increased cost due to war conditions and the unwillingness of rate controlling bodies,—i. e., city councils—to recognize these increased costs as sufficient cause for increased rates. Seeking relief for his court and the parties concerned, Judge Wade suggested that the utility companies and representatives of the municipalities should get together and create a body of some kind that might act as arbitrator or advisor in such disputes as were arising, a body that might proceed with less formality and more speed than it was possible to realize in court procedure and with less expense to all parties, a body which although without the authority of a court would have the confidence of utilities and municipalities, and by their mutual consent be able to adjust their differences.

### BOARD IS TEMPORARY ONLY, HAVING BEEN CREATED AS A WAR MEASURE

As a result of this suggestion a number of meetings were held, and finally on July 26, at a joint meeting of the League of Iowa Municipalities and Owners of Public Utilities in Iowa in Des Moines, a board, called the Board of Conciliation, was named. Its plan of organization provided for a membership of five of which one is to be an engineer and one a lawyer. the members of the board appointed at the meeting mentioned were: Mayor J. F. Ford of Fort Dodge, Dean William G. Raymond of Iowa City, Ex-Judge Clarence Nichols of Vinton, Mayor Truman A. Potter of Mason City and J. H. Ingwersen of Clinton. The rate of compensation fixed for the members was $25 a day and the expenses were to be paid one-half by the municipality and one-half by the utility interested. The board was created primarily as a war measure and it was intended that it should pass out of existence upon the close of the war. It was also provided by the meeting that the same committee of ten that had made the report naming the first board should continue to function as an appointing agency if and when for any reason vacancies should occur on the board.

Mr. Potter, president of the League of Municipalities, called the first meeting of the Board at Des Moines on Aug. 9. At this meeting Mr. Nichols was choosen chairman and Mr. Ford secretary. At a later meeting held at Cedar Falls and attended by a good representation from both the League of Municipalities and the Association of Utilities the following rules were adopted:

### RULES RELATING TO JURISDICTION AND PROCEDURE

I

When a dispute shall arise between any of the municipalities of the state and the owner of any public utility in such municipality as to any question of which the State Board of Conciliation shall have jurisdiction, such dispute shall be brought before the board either

1. By an agreement in writing signed by the parties specifying the particular dispute on which the action of the board is desired and a request that the board take jurisdiction and make determination thereof, or
2. On the written application of one of the parties to the dispute consented by and concurred in by the other party, as hereinafter provided for, or
3. On the application of one of the parties to the dispute where the other party thereto fails or refuses to consent that the board act in relation thereto.

II

In cases where the parties invoke jurisdiction of the board as provided in paragraph one above, no further formal application shall be necessary, but in other cases there shall be an application addressed to the State Board of Conciliation and filed with J. F. Ford, secretary of the board, at Fort Dodge, Iowa. Such application need not follow any particular form but it shall be sufficient to specify the particular matter in dispute and the parties thereto and request the action of the board thereon.

III

Upon receipt of an application such as provided for in Rule 2 above, the secretary shall immediately mail a copy thereof to the other party to the dispute and the latter shall, within ten days after the mailing of such copy, file with the secretary of the Board at Fort Dodge, Iowa, a written communication consenting to and concurring in the request of the applicant for a hearing.

IV

In the event the party to whom the copy of application is sent, as specified above, shall fail or neglect within ten days to consent to the Board of Conciliation acting in relation to such dispute and join in the request therefor, the Board shall proceed to hear the matter on the application of the one party, provided the rules hereinafter set forth are complied with.

V

Whenever the board shall obtain jurisdiction in either of the ways herein specified it shall direct which party shall submit its evidence first and the form and manner in which the same shall be submitted, and the time within which the same shall be submitted and shall also fix the time in which the opposite party shall submit its evidence and the manner and form thereof.

VI

There shall be filed with the board six copies of all agreements, applications or other matter required by the board including copies of any showing of facts to the end that the secretary may furnish one copy to the opposite party and one copy to each member of the board.

VII

The expenses involved in the inquiry shall be paid as follows: Each party to the controversy shall pay the expenses made or incurred by such party, but the fees and expenses of the board shall be paid in the manner specified in the report of the committee of ten, adopted by the joint convention of municipalities and utilities held in Des Moines

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*Abstract of paper read at meeting of Iowa Electric Railway Association, Colfax, Iowa, June 18, 1919.

on July 26, 1918, except that where the hearing is on the application of but one party to the controversy the entire expense of such inquiry shall be paid by such party; provided that the party or parties applying to the board, as hereinbefore specified, shall at the time file with the board an agreement duly executed to provide for the expenses of the inquiry, as above stated.

VIII

The time and place of meeting of the board shall be determined by a majority of the members of the board from time to time, except that the chairman shall call a meeting of the board whenever any three members of the board shall request it.

IX

In acting in any controversy the chairman and at least two other members of the board, to be selected by him shall act.

X

In case of the absence or inability of the regular chairman to act, the remaining members of the board shall select a temporary chairman to act in connection with any inquiry.

XI

The board will from time to time formulate such other rules as may appear to be necessary in the conduct of the business of the board.

### ADDITIONAL RULES OF PROCEDURE OF THE STATE BOARD OF CONCILIATION

XII

In the absence of a stipulation by the parties to the contrary, the utility company shall submit its evidence to the board first, the evidence to be in the form of affidavits and exhibits, and in no case shall oral testimony be submitted except an order be previously obtained from the board to that effect.

In the absence of objections by one of the parties, the board will assume that the rate existing prior to the war was a fair and reasonable rate, in which case the evidence shall be confined to a showing, on the part of the company, of the reasons why the rate should be increased, to meet changed conditions due to the war.

In the event there is objection to the rate existing before the war, then the utility company shall produce its proof on the following propositions:

a. A statement or estimate of the reasonable investment to create the property as and when it was created, including, (1) franchise cost; (2) financing cost; (3) organization cost; (4) construction of the physical plant cost; (5) engineering cost; (6) legal expenses, not included in Nos. 1, 2, and 3; (7) other overhead costs; (8) development cost; (9) accrued capital consumption or depreciation.

b. The annual cost of operation during the years 1913, 1914, and 1915.

c. The annual cost of operation at prices current at the time of hearing.

d. The annual depreciation or consumption allowance.

e. Actual or estimated present patronage or sales of the commodity produced.

f. Actual sales of the commodity produced in each of the three years, 1913, 1914, and 1915.

g. Such additional evidence as in the given case the board may require or permit. The showing shall distinguish between actual figures and estimates, actual figures to be given where possible.

XIII

In the absence of some direction of the board to the contrary, the utility company shall make its showing as above outlined, within ten days from the date when the stipulation of the parties was filed with the board, or the parties had concurred in the hearing, and serve copy thereof within said ten days on the other party, and file proof of such service with five copies thereof with the secretary of the board.

XIV

The municipality, at any time after service of the showing of the utility company on it shall have the right to inspect the books and papers of the utility company, relating to the service, the rate of which is in controversy.

XV

Within five days after the receipt of the showing by the utility company, the municipality shall serve such interrogatories as it desires the utility company to answer, upon the local manager of the utility company, and file proof of service, including five copies of the interrogatories, with the secretary of the board at Fort Dodge, Iowa.

XVI

Within five days from service of the interrogatories upon the utility company, the utility company shall serve upon the municipality a copy of its answers to said interrogatories, and file five copies thereof with the secretary of the board at Fort Dodge, Iowa, together with proof of service upon the opposite party.

XVII

Within ten days after the service of answers to interrogatories on the municipality, or within fifteen days of service of utility company's showing the municipality shall file its showing in opposition to the utility company, with the secretary of the board at Fort Dodge, Iowa, the same to include five copies thereof, together with proof of service of copy thereof on the utilities company.

XVIII

The board may grant such additional time in either of the matters provided for in Nos. 12 to 17 inclusive as may appear to be proper in the particular case.

XIX

After the parties have submitted the showings as above the board reserves the right to call for or permit such additional testimony as it may deem proper.

XX

If requested by the parties, the board will, at any stage of the proceedings, appoint an accountant or engineer, or both to perform such services in connection with the investigation as the parties may agree upon and the board approve.

XXI

After the showings have been completed as herein provided, in case the board elects to visit the municipality and inspect the utility in question, reasonable notice will be given both parties, of the time when such visit of inspection will be made.

### CONTROVERSIES ALREADY SETTLED

On Sept. 4th the board met in Waterloo to determine the order in which it would take up the several questions submitted and to choose an engineer to make a report in the case of one of the controversies in which the city and utility had agreed that the board should make the entire necessary investigation through its own engineer.

At this meeting Mr. Ingwersen had resigned from the board, owing to a change in his business arrangements which took him out of the State.

The board had before it at this time requests for its services from Iowa City, Fort Dodge, Keokuk and Fort Madison. In each of these cities there was a controversy over gas rates. The Keokuk case was the only one in which the board was asked by both parties to make its own investigation with its own engineer, and to this day this is the only case in which such action was taken.

It will be noted that either party to a controversy might secure the service of the board. The board has received and acted on sixteen requests and has received several others that were subsequently withdrawn formally or not pressed, because of other actions taken by the parties. The cases in which both parties joined in asking the services of the board have been six in number, namely, Iowa City, Keokuk and Fort Dodge gas cases, and Grinnell, Marshalltown and Sanborn electric light and power cases. In the ten other cases heard by the board, the utility was the petitioner and the municipality declined to join. These cases were Fort Madison and Mount Pleasant gas cases; Osceola gas and electric light and power case, Chariton, Laurens, Pomeroy, Rolfe and Fonda electric light and power cases and the Des Moines Street Railway rate case. In some of these cases the municipalities declined to recognize the need of the services of the board, standing on their rights under the franchises under which the utilities were operating, claiming that there was nothing to conciliate or arbitrate. In some cases the municipality simply ignored the matter, making no communication to the board.

After the Iowa City, Fort Dodge, Keokuk, Fort Madison and Marshalltown cases had been disposed of the board lost its lawyer member through the resignation of Judge Nichols. This vacancy has not been filled. T. F. Harrington of Sioux City was selected to serve in the place of Mr. Ingwersen and he acted in the Sanborn case, the last one considered. The other cases were heard and passed upon by the three remaining members of the board, Mr. Potter acting as chairman.

In two cases only can the board be said to have acted strictly in accordance with the name—Board of Conciliation. In the Marshalltown case, after hearing the evidence presented by the utility and the questions of the city, the board got the parties together and they agreed on a rate somewhat less than that asked by the utility, and the board proceeded to make an order naming this rate. In the Sanborn case, the company had been charging less than the franchise rate from the beginning of its service, but made a considerable difference between residence lighting rates and rates for power and those of consumers of large quantities. The inequity of the rates rather than the gross earnings of the company annoyed the people, and an ordinance was adopted lowering the rates. From this the company appealed and asked for a maximum a little larger than the franchise maximum. It appeared at the hearing that the company could arrange a step rate within its franchise maximum that would appear more equitable than that in force and that would be sufficient to meet its immediate requirements. The board suggested that this be done at once and submitted to the representatives of the city, and it was done.

In no case did a municipality appear alone asking the service of the board. When only a single interest appeared for the purpose of securing the opinion of the board as to what—on the showing made by the utility—would be a fair rate, this opinion was desired because of the expectation that in subsequent litigation the court would recognize the finding of the board as prima facie evidence of the fair rate to be fixed as the temporary rate pending final settlement of the controversy. This expectation was realized in a number of cases.

### RATE OF RETURN GRANTED

Settlements made through the board were probably more favorable to the municipality than settlements through the courts would have been except in those cases in which the franchise rate was held to be a contract rate alterable only at the will of the city councils, because the rate of return used by the board in computing a fair temporary rate was only 6 per cent. Indeed in some cases it was less than 6 per cent. In a court case it would be incumbent upon the deciding authority to prohibit a rate yielding less than a fair return on the fair value of the property. This fair return would not be lessened as a compromise measure for a presumably brief period. It would have to be the going fair rate of return, and in general this would probably have been recognized as not less than 7 per cent or 8 per cent. A property earning enough to pay 6 per cent would probably be granted no relief under a confiscatory rate plea, but most companies were earning less than this, and while the court may say that a rate yielding 6 per cent is not confiscatory, opinions of master and court have quite generally upheld higher rates as fair. Indeed in the Perry gas case in which the writer sat as master, the parties agreed that 7 per cent on the fair value of the property used in the service would be a fair return, and asked that rates be suggested on this basis.

The members of the board on more than one occasion said among themselves that for a long-time regulation under normal conditions, 7 per cent or 8 per cent would be a fairer rate of return than 6 per cent used in their settlements; but that as a matter of compromise, for a short time, and under the conditions existing, a return of 6 per cent ought to be accepted by the utilities and be satisfactory to the public. Apparently the board's findings were satisfactory.

The municipalities also saved money in the greatly lessened cost of the proceedings. In general it is fair to say that the cost of the investigation and settlement has been greater to the utility than to the city. In some cases the cost was shared equally. In other cases of joint action the whole expense was borne by the utility, and of course this was true in all cases in which the utility was the only petitioner. In the Keokuk case in which the board employed the expert, the total cost was $966. In the Iowa City case in which the parties employed their own experts, the total cost to the city and utility was $1,508. In many cases the showing made by the utility was prepared by members of its regular force without either expert or attorney fees.

### FUNDAMENTAL PRINCIPLES RECOGNIZED

It may be worth while to record certain principles recognized by the board when determining fair compromise rates.

1. In finding value of property, estimated or known actual reasonable investment was used rather than reproduction costs at present prices or prices averaged over an arbitrary period. Estimated depreciation was deducted Meters, small tools, etc., were carried at full cost.
2. That thing known as going value, business value, going concern value, and pernaps by other names, was recognized as an element of value.
3. Except in one or two cases in which the result would have been rates beyond what the traffic would bear, interest on fair value was computed at 6 per cent.
4. With one or two exceptions rates were determined to cover cost of service only. In cost of service was included all so-called operating expense, depreciation, and interest at 6 per cent on the fair value of the property. In the exceptional cases mentioned the rates advised were less than would have resulted from an allowance of 6 per cent interest as an item in the cost of service. These rates were either agreed upon by the parties themselves, or ordered by the board because a higher rate was judged to be more than the traffic would bear.
5. Rates were ordered generally for a period of six months, or for the duration of the war and six months thereafter. When the result of the application of the ordered rate seemed uncertain the order was for a shorter period.

It is well to note that although differences of opinion sometimes existed on the board, its findings were never other than unanimous.

# National Action Can Help Greatly

## How the Federal Electric Railway Commission May Be of Assistance to Electric Railways

BY PAUL SHOUP
Vice-President Southern Pacific Company and President Pacific Electric Railway Company

YOU ASK my comments on the Federal Commission appointed to deal with electric railway affairs, and what it can do.

The efficiency of a commission depends upon its personnel and its power. The personnel is one of knowledge of the industry. The appointments are not political. I am much pleased to see my friend Mr. Gadsden on the Board.

The power is not so apparent. What the electric roads need is *action*, not *recommendations*. We need somebody to *do* something, not *suggest* something. The *needs* of the situation have been threshed out in every city of any size in the United States in the last few years.

The Board, then, faces a difficult situation. It must undertake in a national way to accomplish the results which, to a large extent, local effort has failed to accomplish. The industry is manifestly in a very bad way with 15 per cent of the mileage in the hands of receivers and 40 per cent that would be if not sustained by strong stockholdings or banking interests hoping for something better and accepting permanent or temporary plans for reduced interest charges.

The National War Labor Board in its labor decisions has raised wages of employees on an average, I suppose, 50 per cent and even more for the lower-paid employees, due to the increased cost of living, and where cases have not been before the Board, the companies have voluntarily made large increases, or the influence of the War Labor Board's decisions has resulted in like increases in neighboring cities. The cost of materials used in maintenance has increased 60 per cent to 150 per cent.

The War Labor Board has recommended in connection with its labor decisions, increases in fares to meet the increased payroll at least, but what response have the communities served given? The deplorable state of the industry makes answer. In many cases the public has responded favorably. State commissions have acted to meet the situation when within their power, but this is not true to the degree necessary to put the companies in as good a position as they were in 1914—and that was not a satisfactory one.

### THE PEOPLE WILL BE FAIR IF THEY UNDERSTAND

Only a local sympathetic understanding of their own relations to the electric railways which give them service, by the people served, will bring about a solution. This can be done by a nation-wide campaign that will give a clear general knowledge of the situation, supplemented by an active and vigorous local and state educational program which shall bring the subject home to every patron as something affecting his interests in which he has a personal concern directly, both because of the service he needs and the effect of its loss upon the community where his interests lie.

Let us not cheer ourselves with the belief that the people of the United States are sitting up worrying about the financial needs of the electric lines. Chiefly they are concerned with problems immediately affecting their own bread and butter, or, if in the upper financial stratum, their own bank accounts, large or small. They take about as much interest in the financial difficulties of an electric line as they do in the receivership of a department store, flour mill, or a lumber yard—we all say "too bad, sorry to hear it" and let it go at that.

But as a whole, the people are eminently fair if the truth reaches them, which largely it does not, because the relations between real education and selfish propaganda are entirely too close.

The real question, then, for this Commission to answer is: How shall each person directly or indirectly concerned be made to know, to heed, to be interested in the true facts affecting the company giving his community service?

The Commission has whatever value a national creation may give it. It will need organization, money to work with, intensive personal effort on the part of every member, and the whole-hearted active and sustained effort of all the electric railways in the United States and all associations directly or indirectly dealing with electric railway affairs. It is not within my province to suggest how it should go about its work; that would be an intrusion. But as things to be done, these suggestions, none of them new, may be of interest:

### WHAT MIGHT BE DONE

1. *Ask the Congress to pass a bill creating a 7½-cent coin.* The nickel of 1914 had as much purchasing power as such a coin would have now. Convenience is a great factor in people's lives. Habit follows upon convenience. It will be easier to spend a 7½-cent coin for street car fare than it is a nickel and two or three pennies. Secure by local action substitution of this coin for the nickel fare. If lower fares are necessary, sell tickets, monthly "readiness-to-serve" tickets, or strips of tickets, ten or more.

2. *Carry on a Campaign to*

(a) Increase urban fares, increase suburban commutation fares and put others on a mileage basis.

(b) Eliminate or prevent jitney and motor-truck competition where electric railway service is adequate, and everywhere insist that such competitors bear burdens in proportion to business done as heavy as those of the electric lines—taxation and all other public obligations.

(c) Reduce obligations that are onerous, now exacted by legislation. These subjects will include:

(1) General taxation which, in California, takes 5¼ per cent of the gross revenue,

(2) Franchise taxation, taking 1 per cent to 5 per cent of the gross revenue,

(3) Paving and maintenance, a relic of horse-car days when hoof beats battered the pavements.

(4) Cost of putting wires underground, replacing wooden with iron poles, separating grades, maintaining at the railway's sole expense watchmen that other traffic needs have made necessary.

(5) Free transportation, demanded by franchises, which should be reduced to a minimum.

(d) Amend franchises so that the values of investments will not be automatically destroyed by the passage of time.

(e) Consider wage questions only in connection with income hereafter, a principle to be adopted because of the narrow margin now between operating expenses and taxes and income.

Surely no one is rash enough to suggest that any electric railway of any consequence anywhere in the United States is earning a fair return on the money invested.

Any industry in which capital does not earn a fair return of course attracts no capital. That industry must then, in course of time, disappear as its facilities wear out. Employment of labor then disappears also.

### ACTION AWAITED WITH INTEREST

We, in California, await with great interest the action of the new commission. In this State, probably one and possibly two electric roads earned a fair return on capital invested the last year. These two owe their prosperity solely to war business activities. But 90 per cent of the invested capital in that industry in this State received less than 4 per cent and a good many millions none at all. And by invested capital is meant cash actually put in the properties.

## Manchester Is Planning to Develop

IN VIEW of the town-planning scheme contemplated by the Corporation of Manchester, which provides for the construction of three new arterial roads upon the southern side of the city and the building of thousands of houses, the tramways committee is giving attention to the transport facilities which will be needed. The *Manchester Guardian* quotes J. M. McElroy, general manager, in regard to the present congested state of the main arteries of the city, owing to the increasing traffic. Parallel thoroughfares, he said, must be provided somehow, so that the flow of traffic to and from the proposed new residential districts might be frequent and efficient. With regard to the arterial roads in the town-planning scheme, Mr. McElroy pointed out that the proposal of the tramways committee was not to put down tram rails right away into virgin country. The motor omnibus would be the pioneer of the tramways. Builders, whether municipal or private, would not put up houses unless they were assured that rapid and cheap transport would be provided, and the ultimate proposal was to have cars running at a high speed upon a specially prepared track somewhat after the manner of an American interurban line.

"The government department," said Mr. McElroy, "recognizes very clearly now that the successful solution of the housing and town-planning problems must include adequate means of transport. The fact that the government has set up a Ministry of Transport shows that the importance of this matter is for the first time being properly recognized in this country. Proper transport has a vitalizing effect upon the whole community."

## The Committee of One Hundred Begins Work

### Now Is the Time for Unstinted Effort and Unlimited Co-operation to Prepare Electric Railway Case

THE Committee of 100, which was recently appointed by President Pardee to prepare and present the case of the electric railways before the newly created Federal Electric Railways Commission, held its first meeting in New York on June 26. It was the consensus of opinion that the opportunity presented by the creation of the federal body is one of which the industry should not fail to take advantage. Several subcommittees were appointed to work up the various aspects of the case.

Guy E. Tripp, chairman of the committee, after stating the purposes involved in the appointment of the Committee of 100, emphasized strongly the importance of the work and the responsibility of the individual members of the committee. In his opinion, the situation demands extraordinary effort on the part of every individual. President Pardee, P. H. Gadsden and other members of the committee spoke along similar lines and urged hearty support to the committee. In this connection, it was said that the association staff is already working up data, and some companies have offered to loan members of their staff for the furtherance of the committee's work.

The general executive committee consists of the chairman and vice-chairman. The sub-committees, whose personnel will be anounced later, will include a committee on publicity, a committee on presentation and a committee on recommendations. The committee on presentation will supervise the preparing and presenting of data, while the committee on recommendations will work up the concrete suggestions which to the electric railway industry seem to promise the best solution of its problems. Special attention will be given to the matter of publicity by the committee appointed for this purpose.

It is now thought that further hearings will be held by the Federal Electric Railways Commission in Washington at the rare of about two a week, but final plans in this respect have not yet been decided upon. The Committee of 100 expects to complete its work for presentation before the federal commission at the earliest possible date.

## Contemplated Electrifications in Japan

According to a Japanese contemporary some important heavy electrification work will soon be undertaken in Japan. The work already decided upon comprises the following: Yokohama to Numazu, 67.4 miles; Ofuna to Yokosuka, 10 miles; Uyeno to Ohmiya, 16.6 miles; Ryogoku to Chiba, 22.7 miles, a total of 116.7 miles. The authorities plan to send engineers into nine provinces surrounding Tokyo in quest of promising water power sites. A part of steam roads entering Tokyo have already been electrified.

On the United Railways of St. Louis, the exhaust from the air-brake cylinders is piped into the flue pipe of the coal stove carried on the cars. In this way a better draft is secured, and as the company burns soft coal, the result has been very satisfactory to passengers.

# Sewer Work Puts Extra Tax on Way Department in Brooklyn

### Tracks Had to Be Removed and Temporary Routes Provided to Insure Minimum Interference with Passenger Traffic

THE expense incurred by electric railways due to sewer construction is a considerable factor in street railway operation and one which is not generally appreciated. These expenditures mount up to hundreds of thousands of dollars from which neither the railway nor the fare-paying public derives a benefit. In most sections the railways have assumed this burden in order that the flow of traffic may be interrupted as little as possible.

Two very extensive pieces of sewer construction have been taking place in the Borough of Brooklyn, New York, during the past five years. The first is what is known as the "Classon Avenue relief sewer," which was begun in 1913 and required five years to complete. The second is the "Ocean Avenue" sewer, which is now under construction from Avenue O to Sheepshead Bay, a distance of 2 miles. This work was begun in the summer of 1917 and is now about complete.

SEWER WORK IN PROGRESS, TEMPORARY TRACKS AND OVERHEAD WIRES INSTALLED AT SIDE

In size the main portions of the Classon Avenue sewer rival the dimensions of a subway tunnel large enough to accommodate railway trains. Many of the streets through which this sewer passes are occupied by surface and elevated lines of the Brooklyn Rapid Transit Company. An expenditure by the railway company of $228,000 has been necessary to care for and protect the tracks and overhead structures and to continue car operation without interruption during the long period occupied by the sewer work. The work done by the railways has included the reconstruction and underpinning of elevated railroad columns and foundations, the installation and removal of temporary tracks, the installation and removal of many portable crossovers, the entire removal of tracks and pavements from the streets in a number of places, the removal and replacement of overhead wires and poles, the purchase and installation of expensive special track work to provide switches and curves for rerouting of cars, and the replacement of tracks and pavements after the work was completed. The work on this sewer extended along or across tracks for a distance of about 4 miles and 2.27 miles of single track was removed and replaced on seven different streets in the course of the work. The cost to the railway company varied from $4.22 to $79.55 per lineal foot of street.

TEMPORARY DOUBLE TRACKS IN PLACE PREVIOUS TO REMOVAL OF MAIN TRACKS ON OCEAN AVENUE, BROOKLYN

During this construction there was a decrease in income on the lines affected of $300 per day and there was no apparent increase elsewhere to indicate that the traffic was being carried by either the elevated service or by other surface lines. The Tompkins Avenue line, though not on a business street, was discontinued and rerouted for two years. There also was one other line on a large sewer project which was without car service for one year and had only a single-track service for two years more.

For the construction of the Ocean Avenue sewer it was necessary that both tracks, approximately 4 miles of single track, be removed and temporary tracks built in the roadway alongside. Fortunately the street was wide enough to permit this. The method of doing the work together with the conditions encountered are suggested in the accompanying illustration. All of the track work was done without interruption to car traffic, as this line is one having a very heavy car service in the summer months. In addition to the removal of the tracks and the building of temporary tracks the original tracks had to be restored following the sewer work.

MAIN TRACKS REMOVED AND TEMPORARY SINGLE TRACK IN PLACE DURING CLASSON AVENUE SEWER CONSTRUCTION

SOME TYPICAL LAYOUTS WITH CONTINUOUS MANGANESE TYPE OF RISERS

This meant the reconstruction of 8 miles of single track to provide 2 miles of sewer work. Naturally the cost of so much track work was high and it is estimated that it will ultimately cost the company more than $40,000. Unfortunately, owing to war conditions, it was necessary to replace the old rails, when in a good many cases it would have been desirable to lay new rails if they had been obtainable.

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# Risers Increase Life of Frogs and Mates

### Different Types of Construction Used by United Railways of St. Louis to Support Wheel Flanges at Crossings

By C. L. Hawkins
Engineer, Maintenance of Way, United Railways Company of St. Louis, Mo.

SPECIAL steel risers placed in the rail flangeway of built-up frogs, crossings and mates to prolong the life of such pieces by supporting the wheel flanges at intersectons were in general use upon the tracks of the United Railways of St. Louis in 1904. At that time the risers were so placed that the distance from the top of the rail was equal to the depth of the wheel flange, but in December, 1905, the thickness of risers was increased ⅛ in. This change in construction increased the life of the frogs, as there was practically no wear on the rail at the receiving side of intersections until the upper ⅛ in. of the riser was worn out.

The risers were of intermittent type and were constructed of Black Diamond tool steel riveted or dovetailed into the rail flangeway. The rivets were driven vertically through the riser and the lower portion of the flangeway and when the risers were renewed the new risers were fastened to the rail by screws driven into the rivet holes, which had previously been tapped for the purpose. Wheel flanges passed directly over the countersunk heads of the rivets or screws, and where rivets were used the lower heads of the rivets were countersunk to prevent interference with the joint plates.

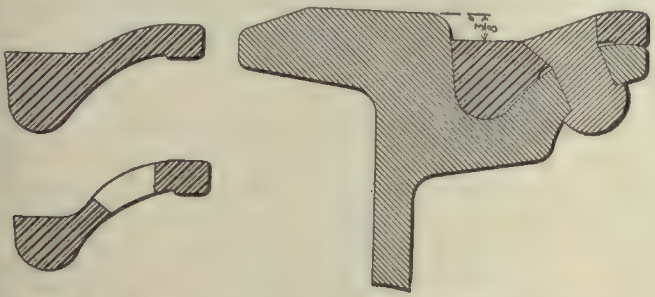
In 1910, manganese-steel risers were adopted and the use of tool-steel risers was discontinued. These risers were somewhat longer than the tool-steel risers and they provided more satisfactory approaches. They were attached to the flangeway in the same manner as the tool-steel risers and the wheel flanges were carried directly over the rivets as before. These risers were a substantial improvement over the tool-steel risers.

When solid manganese types of frogs, crossings and mates were adopted in 1911, the pieces were cast with raised flangeways or risers of the intermittent type, having approximately the same shape as the flangeways of the built-up pieces formerly protected with the renewable risers. The flangeways of frog points were

RENEWABLE RISERS AND BUILT UP MATES

½-in. deep for ⅝-in. wheel flanges. During 1915, however, the length of risers was increased so that continuous risers extending from one end of the crossing to the other were provided in a double-track crossing installed at Broadway and Washington Avenue. A number of crossings of a similar type were later installed at other locations. These crossings have given very satisfactory service and the additional expense of these changes has been justified.

On account of the excessive prices of solid manganese steel special work during the war period, a renewable continuous riser was adopted in September, 1916, for use on built-up crossings. The first crossings were laid at Seventh and Locust Streets and they are in use to-day. These risers were designed for use with 9-in. 132-lb. Lorain trilby rail, Section 440, and completely cover the flange and groove of the rail. They are attached to the rails by ½-in. standard button-head rivets, driven through the outer portion of the flangeway where they are untouched by wheel flanges. About 100 crossings provided with risers of this type have been installed, the number of locations being about fifty. Some trouble resulted from the use of ½-in. rivets for attaching the risers to the rails and the size of rivets was then increased to ¾-in. The results secured from these crossings have been satisfactory except at a few locations where the rivets have been sheared off and the manganese risers have disintegrated. As the cast manganese risers are rather rough castings, which require considerable grinding before they can be properly seated and surfaced, some of the disintegration can probably be charged to improper seating. By increasing the size of rivets to ¾-in. it is expected that this trouble will be overcome.



SECTIONS OF CONTINUOUS MANGANESE RISERS

The risers are designed for use in 90-deg. crossings, but by means of an oxy-acetylene torch the same risers can be shaped for use in crossings with intersection angles as sharp as 54-deg.

Built-up mates protected with the continuous riser type of construction have given very good service and have greatly reduced the cost of mates used on the lighter lines. The risers are strong enough to assist in tying the rails and the mate together, and have been much more satisfactory than the tool-steel risers used in bolted mates where the risers were so soft that the metal was "squashed" out and acted as a wedge to pry loose the short rail in the built-up mate. About twenty-five built-up mates with continuous manganese-type risers are in use to-day, the first of which was laid at a heavy intersection at Sixth and Locust Streets on July 8, 1918. These mates are especially for use at locations where the heavy run is the straight run.

The accompanying photographs show typical layouts with continuous manganese-type risers.

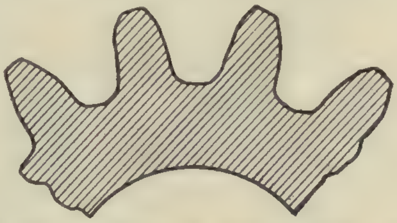
The chilled cast-iron wheels used by the United Railways are equipped with heavy flanges, and only a small portion of the chipping of flanges has been charged to the use of the risers in frogs, crossings and mates.

## Shop Notes from Croydon

IN ACCORDANCE with the usual British practice, all wheels used by the Croydon Corporation Tramways, of which T. B. Goodyer is manager, are of the steel-tired variety. They are of 31¾-in. diameter new and the tires are permitted to wear from their original thickness of 2¼ in to a minimum of ⅝ in. The tires as delivered hitherto have given a life ranging from 85,000 to 112,000 miles. Mr. Goodyer, however, was just as prompt in applying to wheel tires the "sorbitic" process of "hardening in place" as he was to rails, and twelve tires were so hardened during the fall of 1918. It is, of course, too soon to draw any conclusions from this experiment, but the process is inexpensive and has already shown happy results in prolonging the life of the track.

Although the Corporation Tramways operate surface cars only and at moderate speeds, Mr. Goodyer uses Cincinnati tool-steel gears and pinions; he was, in fact, the first British operator to use gears and pinions of this kind. The condition of the first pinion, installed on June 27, 1913, as it appeared on Nov. 8, 1917, is shown in the accompanying drawing. At that time this pinion, operating on a GE-52 motor, had run 103,641 miles. It showed on the pitch line a wear of but 0.023 in., or the equivalent of 4506 miles per 0.001 in. At this rate of wear, which has been consistently maintained since the foregoing measurements were made, these pinions will be good from ten to fifteen years.

As for the gears of the same type, they are wearing so slowly that their useful life is figured to approximate a century! Gears of other manufacturers in the same service have never done better than 41,000 miles. The use of split gears is standard in Croydon. Mr. Goodyer believes that what is best is cheapest in the long run, and especially on account of the great war shortage, it was desirable to have pinions, gears and other equipment that could be relied upon to wear safely and long.


CROYDEN GEAR TOOTH PROFILE AFTER GEAR HAD GIVEN MILEAGE OF 103,641

Another Croydon shop practice of interest is the use of oil spindles in place of graphite bushings in the trolley wheels. These wheels are 4 in. in diameter in accordance with the practice of many other British roads. The graphite spindles were not found to be good enough, owing to the excessive side reach of the trolley poles, necessitating the use of from 29 lb. to 30 lb. tension. Another item is in the use of locknuts, as on brake suspensions and motor-case bolts, a little item in which Croydon is ahead of many American lines. The locknuts used are not considered perfect, but they are far better than the ordinary fastenings which soon work loose under vibration. Renewable controller contact fingers, as made by the White Engineering Supplies Company, are used also, affording another evidence of the local attention to economy and reliability in small as well as large portions of car equipment.

# AMERICAN ASSOCIATION NEWS

## Director of Exhibits Appointed

GEORGE W. WELLS, recently with the Engineering Department of the Bureau of Industrial Housing and Transportation, has been appointed Director of Exhibits of the October convention and will have charge, under the Exhibit Committee, of all details of the exhibits. Mr. Wells for a number of years was manager of the electric lighting and street railway system in Tampa, Fla. He was also superintendent of the mechanical department of the West Penn Railways and president and manager of the Wells Mills Electric Company, which operated among the mills and mines of western Pennsylvania and West Virginia.

Secretary Burritt announced on Thursday that applications had been received for about 34,000 sq. ft. of space, or more than half of the space probably available. This insures the success of the exhibit feature of the convention.

## Revision of Electric Railway Fire Code Rules Under Way

THE standing committee of the Electrical Committee of the National Fire Protection Association on cars and railways has under consideration the revision of the requirements of the National Electric Code on wiring of carhouses. In addition to this review attention will be given to the question of formulating rules applicable to railway systems and cars operating at voltages from 600 to 1500 volts. Two special committees of the American Electric Railway Engineering Association are co-operating in this work.

Any person having suggestions or recommendations on the Code rules covering these subjects is invited to communicate with the chairman of the standing committee, Martin Schreiber, Public Service Railway, Newark, N. J.

## Engineering Standards Committee Appointed

SECRETARY BURRITT has announced the personnel of the standards committee of the Engineering Association for the current year, as follows: H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, chairman; E. J. Blair, electrical engineer Metropolitan West Side Elevated Railway, Chicago; E. R. Hill, Gibbs & Hill, New York City; C. G. Keen, engineer way and structures American Railways, Philadelphia; John Leisenring, signal engineer Illinois Traction System, Springfield; John Lindall, superintendent of rolling stock and shops Boston Elevated Railway; Norman Litchfield, mechanical engineer American Car & Foundry Company, New York City; H. H. Norris, ELECTRIC RAILWAY JOURNAL, New York City; E. D. Priest, engineering department General Electric Company, Schenectady, N. Y.; Martin Schreiber, chief engineer Public Service Railway, Newark, N. J.; W. C. Starkey, chief engineer Ohio Brass Company, Mansfield, Ohio; A. B. Stitzer, chief engineer Republic Engineers, Inc., New York City; N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa.; Robert C. Taylor, superintendent of equipment Michigan Railway, Albion, Mich.; E. B. Trist, Carnegie Steel Company, Pittsburgh, Pa.

## Toledo Section Elects Officers

THE annual election of the Toledo joint company section, held on June 9, resulted in the choice of M. H. Somerville for chairman, P. J. O'Neill, Jr., for vice-chairman, W. M. Bergen for secretary, Harry Fowler for financial secretary, and Del. Miller for treasurer. Nine members of the executive council were also selected. An entertainment program was given after the election.

## Chicago Section Closes Season

THE final meeting of the section year was devoted by the Chicago Elevated Railways section entirely to entertainment, principally music. It was held on June 17, with seventy-five members present.

# LETTER TO THE EDITORS

## The Safety Car and the Skip Stop

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, TERRE HAUTE DIVISION
TERRE HAUTE, IND., June 23, 1919.

To the Editors:

I read with interest your editorial in the current number of the ELECTRIC RAILWAY JOURNAL, discussing the safety car in connection with the skip stop.

At the time we commenced operating safety cars in our city, we were operating skip stops at the request of the United States Fuel Administration, transmitted to us through the local Fuel Administrator for this county. Just prior to installing safety car service, we advised the County Fuel Administrator, at whose request we had put into effect the skip stop, that coincident with the commencement of safety car operation on our lines we would abolish the skip stop, for the reason that the safety car would save much more power than it was ever hoped to save by skip stops with the larger and heavier types of cars which the safety cars superseded.

Anyone who has had much experience with the jitney bus as a competitor will, I feel sure, readily admit that the "skip stop" is a very fine thing—for the jitney bus

E. M. WALKER, General Manager.

The Birmingham Railway, Light & Power Company, Birmingham, Ala., has started operating its new brass foundry. From now on, brass parts necessary for replacements and for the repair of cars will be cast in the company's own shop. The company has an iron foundry which is equipped to make any necessary emergency castings. The first lot of brakeshoes to be made since the foundry has been in operation were cast recently.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Massachusetts Strike Over

### Threat of President Mahon of Amalgamated to Annul Union Charter Ends Walkout of 3500 Men

The strike on the Eastern Massachusetts Street Railway, which began June 16 on the Lowell division and spread to most of the lines north of Boston last Sunday, ended on June 25 as a result of the threat of W. D. Mahon, president of the Amalgamated Association, to annul the charters of the unions involved in the walkout unless the men returned to work on that day. About 3500 carmen were involved. The strike originated in a protest of the Lowell employees against the use of the Rooke fare register on open cars.

On Jan. 8 last some 450 Rooke registers were installed on cars operated by the Bay State Street Railway, the predecessor of the Eastern Massachusetts Street Railway. Additional stocks of registers have since been added until now there are about 750 in use, and there had been no interruption in their use until the strike of the Lowell conductors based on their claim that the use of these registers on open cars was unsafe. In reply the trustees of the company insisted that the registers could be used with safety on open cars, and said that those originally installed by Receiver Donham had proved very satisfactory and hence had been continued.

Union officials ordered the matter to be submitted to arbitration, but the men refused to obey their orders. On the lines south of Boston car service was well maintained except on the Quincy division, where the local union struck in sympathy with the men on the northern lines. In his appeal to the men Mr. Mahon pointed out the loss in death, disability and old-age benefits, which would be sacrificed if the men persisted in defying the officials of the union.

Industrial conditions in northern Massachusetts were greatly upset by the strike. The trustees of the company did not attempt to operate the divisions involved during the walkout, but offered to reinstate all strikers who returned to their work on Wednesday morning.

## As the Union Sees It

A recent issue of the *Union Leader*, the official organ of the Amalgamated Association in Chicago, has an editorial in reference to the new federal electric railway commission. In this it says:

> Wherever the trouble lies in the electric railway business the cause should be located and the remedy applied. In its present condition securities are shrinking, service is suffering and the employees are bearing more than their share of the load.
>
> Unlike the steam railroads, which were taken over by the government as a war measure and guaranteed a fixed return on present capitalization—real and intangible—the electric railways have had to meet the continuously rising costs and weather the storm the best they could, without any assistance from the government, though they were virtually compelled to accept cost determinations by a government agency on the biggest item of expense in their business. Bad as the financial organization and methods of some of the electric railways are reputed to be, they cannot be compared with the steam railroads in financial jugglery, the history of which spells scandal and is common knowledge.
>
> Placing the electric railway industry on a sound business basis will not only promote the development of the nation, but prove beneficial to all factors in the business—security holders, public and employees.

## Illinois Utilities Plan Campaign

Public utility managers and operators of Illinois held a meeting in Springfield, Ill., on June 13 and laid plans for closer co-ordination of effort in placing the after-the-war case of the industry, as a whole, before the public. To bring about a better understanding of the situation which the electric railway, electric light and power and the telephone and gas companies face, in common with all other lines of business, due to the high cost of materials and labor, managers of all utility companies operating in the various towns and cities of Illinois are to organize to unify their efforts.

Acting through the Illinois committee on public utility information, which is operating under the auspices of the Illinois Electric Railways Association, Illinois Electric Association and the Illinois Gas Association, a program is to be carried on fully to inform the citizens of the State as to the situation of the industry. It was pointed out at the meeting that unless the $1,000,000,000 investment of the utility industry in Illinois is fairly treated and a better understanding of its position brought about, much injury can be wrought, and the services rendered by these companies disrupted. Speakers at the meeting declared that the ramifications of the industry in the State were such that fully one-third of all citizens, directly or indirectly, now have a financial interest in the companies, either as wage earners, security holders or through collateral industries dependent upon the utilities. Of the total of all citizens, 16 per cent are in the employ of the electric, gas, telephone, water and electric railroads. It was particularly insisted that a better understanding be created because of the need for the investment of $450,000,000 of additional capital by the utilities in the State within the next five years.

## Seattle Branching Out

### Municipal Ownership in Pacific Coast City Growing by What It Feeds Upon

Preliminary steps are being taken by the city of Seattle, Wash., toward opening negotiations for the purchase of the Seattle & Rainier Valley Railroad, including the interurban lines from Seattle to Renton. The utilities committee of the City Council has under consideration a report by Thomas F. Murphine, superintendent of utilities, based on reports by the State Public Service Commission and investigations by the Seattle utilities department, in which Mr. Murphine gives the original production cost of the system as $1,347,498.

#### OFFER IS REALLY A RENEWAL

Mr. Murphine estimates that under favorable conditions, which the city has authority to assure, the Rainier Valley lines could be operated at a profit on a 5-cent fare. The value to the municipal system of the company's Fourth Avenue tracks is inestimable.

When negotiations for the purchase of the property of the Puget Sound Traction, Light & Power Company were pending, owners of the Seattle & Rainier Valley lines offered that property to the city for $1,800,000. The price was considered too high, and the matter was dropped temporarily. When the Public Service Commission gave the company authority to increase the fares from 5 to 7 cents, the matter again became a live issue, following the petition of the residents of that district for the city to purchase the line.

#### ESTIMATED WORTH, $1,347,498

While estimating the original cost of the present system at $1,347,498, Mr. Murphine calls attention to a heavy depreciation in the value of the rolling stock, tracks and overhead system. It is claimed that the rolling stock, which originally cost $319,964, would require the immediate expenditure of $100,000 to put it in good condition. The overhead system is said to be worth no more than 50 per cent of the cost of a new system. Tracks are reported to be in such condition as to require the expenditure annually for five years of an amount double the sum spent by the company annually for maintenance.

Authority to extend the operation of municipally owned transportation lines for a distance of 8 miles outside the city limits is provided in a bill passed by the last Legislature. This bill was passed with the understanding that the city would purchase the Rainier lines.

# Pittsburgh Arbitration Details

## Company There Lost 12,052,011 Passengers in Eleven Months Under Five-Seven Cent Fare

The hearing in the arbitration of the wages of the employees of the Pittsburgh (Pa.) Railways, to which brief reference was made in the ELECTRIC RAILWAY JOURNAL for June 21, developed some very interesting points. One of the most significant bits of information brought out was that the valuation of the properties of the railway, which has been under way for months, is expected to be completed before July 1 and that financial interests are now investigating to ascertain what help is needed to put the company in proper condition. The valuation is being made by a joint commission comprising representatives of the company, the city of Pittsburgh and the Public Service Commission.

### AUDITOR'S STATEMENT INTERESTING

Testimony offered by witnesses for the receivers the second day of the hearing, particularly that of J. A. Mead, auditor of the company, was replete with interest. Mr. Mead submitted several sets of figures illustrative of the effect of fare increases upon revenue, and showing the condition and financial history of the company.

Mr. Mead declared that no one could operate the lines of the company at a reasonable profit based upon their value. He said that not a dollar had been paid in dividends upon the stock of the Pittsburgh Railways since the organization of the company in 1902. When asked if the system could be operated profitably if the valuation were cut 50 per cent, Mr. Mead declined to commit himself further than to say that under certain conditions there might be a surplus over fixed charges.

According to Mr. Mead for every dollar of the $1,500,000 the company now has in cash there were claims for $7, aside from the claims of the city. The company was now using up its capital, by reason of not being able to keep up repairs.

### AVERAGE FARE 6.23 CENTS

When the company increased fares from 5 cents to 5 and 7 cents, the proportion of riders at each rate worked out in such a way as to make the average fare 6.23 cents, an increase of about 25 per cent. The number of passengers carried, however, fell off 12,052,011 in eleven months. This factor reduced the revenue increase to a little more than 13 per cent.

There was doubt whether even a fare increase would serve to make a wage raise possible, counsel for the receivers declared J. M. Loftis, superintendent of transportation, on the stand, produced a list of railroad stations accommodating territory in which street cars would be unable to compete with the steam lines were fares still further increased. It was shown that at best a higher fare would have to be imposed by areas, with constant consideration for steam railroad competition. Short rides in territory not traversed by steam lines would have to be made more costly than long rides in railroad-served districts.

Witnesses from the employment office of the company testified that there was no labor shortage in Pittsburgh now, and that the company was having no difficulty in keeping its force of 3000 platform men recruited at present wages.

P. N. Jones, general manager of the Pittsburgh Railways, said that every 1-cent increase in wages added about $85,000 to the expenses of the company and that the 12-cent increase asked by the men would cost about $2,000,000 annually, because it would necessitate raises for other than platform employees.

W. D. George, receiver, declared that the receivers felt the receivership "would be broken down if an increase in wages became necessary." C. A. Fagan, receiver, testified that interest and rentals have not been paid for months, that taxes were being defaulted and that the company was unable at present to meet many ordinary operating expenses.

The case presented by counsel for the employees the first day of the hearing was based principally upon the outcome of the Detroit wage dispute and increased living costs. Witnesses testified that rentals in Pittsburgh had gone up 25 per cent in the last year and that other costs correspond. P. J. Ward, business agent of the local union, said that car men working at the present maximum rate of 48 cents an hour, nine hours a day and seven days a week, made $133 a month. Wages being paid workers in the building trades were submitted as a basis of comparison. Counsel for the receivers in cross-examination, brought out the difference in the class of labor involved, especially the difference in the time invested by the building worker to learn his trade.

# Developments in St. Louis

## President McCulloch Charged with Complicity in Referendum Theft, but Issues Denial

On June 23, Richard McCulloch, president of the United Railways, St. Louis, Mo., handed his resignation as manager to the receiver to Rolla Wells, receiver of the company, after a warrant had been issued by Circuit Attorney McDaniels, charging him with burglary in connection with the theft of the now famous referendum petitions a year ago.

At the same time Bruce Cameron, superintendent of transportation, who for some time has been under indictment on a charge of burglary in the second degree in connection with the same theft, also sent his resignation to Receiver Wells. The latter accepted both resignations and then issued a formal statement announcing that he did so not because he had prejudged the charges made against Mr. McCulloch and Mr. Cameron, but "merely because the iteration of these charges has impaired the efficiency of these gentlemen to perform their respective functions. The determination of the truth or falsity of these charges must rest with the proper judicial forum."

Upon hearing that a warrant for his arrest had been issued, Mr. McCulloch appeared before Judge Krueger in the Court of Criminal Correction, waived reading of the information and pleaded not guilty. A hearing on the charge was set for July 7 and Mr. McCulloch's bond was fixed at $2,500. On the previous Saturday Mr. McCulloch had issued a written denial of the charge that he planned, ordered and directed the theft of the referendum petitions which was made on the witness stand before Special Master Lamm by Julius C. Jackson, former special agent of the company, and James F. Brady, at present confidential agent in the claim department of the United Railways.

The statement issued by Mr. McCulloch follows:

> I have read the statements published in the press, purporting to have been made by Julius Caesar Jackson and James F. Brady as witnesses in the hearing before Judge Lamm as special master. These alleged statements, so far as they relate to anything I am alleged to have said or done with respect to the referendum petitions, are unqualifiedly false.
>
> I did not suggest, direct, authorize or countenance the taking of the referendum petitions by Jackson or anyone else. I have never had any conversation with Jackson or anyone else concerning that matter, and had no knowledge that Jackson or anyone else entertained any such plans. I never had any meetings with Jackson, either at the company's office or anywhere else, and never at any time gave him any instructions, either directly or indirectly, on any matter whatever; indeed, I do not remember ever having seen him but once, which was long prior to the time that the referendum petitions were being circulated.
>
> I did not give any money to Brady to take to Jackson, or authorize or direct him to go to see Jackson or carry or convey any message to him.
>
> I do not intend to go into detail with respect to the various statements made by either Jackson or Brady, except to say that I had nothing whatever to do with the matters mentioned by them.
>
> The fact that both Brady and Jackson told a different story before the Grand Jury which investigated this matter last summer than the story they now tell should of itself convince anyone that their statements are not to be relied upon.

Both Mr. McCulloch and Mr. Cameron had been with the electric railway system of St. Louis for many years, the former since 1893 and the latter since 1900.

Following issuance of the warrant against Mr. McCulloch, Circuit Attorney McDaniels announced that the grand jury would immediately undertake a new investigation of the petitions theft and that among the first witnesses subpoenaed were Jackson, Brady, George W. Baumhoff, former manager of the old St. Louis Transit Company, and Ephrim Caplan, counsel for John W. Seaman in the receivership suit against the United Railways directorate. Mr. Baumhoff on the witness stand also had linked Mr. McCulloch with the plans for the theft of petitions.

Other important developments in the hearings were the following:

Announcement by Special Master Lamm that he probably would not come to a decision in the Seaman suit for a receivership until next fall.

Announcement by Charles W. Bates, attorney for the receiver, on the witness stand that the receiver had ordered discontinued the payment of $1,000 monthly to the North American Company as "fiscal agents" of the United Railways which had been made prior to the appointment of a receiver.

Testimony by David R. Francis, Jr., a former director of the United Railways, that James A. Hooke, director of public utilities for the city of St. Louis, was one of the men who had advised him that the power contracts of the railway with the Union Electric Company, St. Louis, should be approved. The plaintiffs had charged that these contracts were instances of mismanagement on the part of the directors.

Testimony of John I. Beggs, director of the United Railways, that power contracts made by the railway in 1908 were instances of economy as it would have cost $5,000,000 to build plants for making at St. Louis the power brought from Keokuk and that the company could not raise such an amount. The plaintiffs had cited the 1908 contracts as other instances of mismanagement.

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## Council Acts on Detroit Matters

### City Body at Odds with Commission on Referendum, but Approves Railway Agreement—Wage Scale Restated

On June 20 the City Council of Detroit, Mich., voted to postpone indefinitely consideration of a plan for a postcard referendum on the railway question as formulated by the Street Railway Commission, voted to continue the present working agreement with the Detroit United Railway in force until a subway car can be built, and appointed the city's arbitrator with an alternate to act in case the first named declined the appointment.

#### COUNCIL ACTS PROMPTLY

This action was taken during the absence of Mayor Couzens from the Council chamber. In the opinion of the Mayor the Council acted in too great haste and without considering a greater list of possibilities before appointing James S. Holden and William H. Maybury as arbitrator and alternate. The action taken, however, has been commended by prominent citizens as the most constructive step toward the settlement of Detroit's transportation difficulties in a long time.

At the meeting on June 23 two Councilmen reversed their opinions and held out for further consideration of the matter, thus upholding Mayor Couzens, and as a result the resolution of June 20, originated by Councilman John C. Lodge, was not reported out. Although nearly half of the time named in Judge Marschner's court order has elapsed without an arbitrator being decided upon, one Councilman argued that there was no particular hurry as the railway had not appointed an arbitrator and that the representative of the company should be appointed first.

An amendment providing that the three propositions embraced in the Lodge resolution, the Rapid Transit system, the appointment of an arbitrator and the agreement with the Detroit United Railway Company, should be voted on separately, also failed to pass.

The agreement which Councilman Lodge proposed be drawn up provided that the board of arbitration called for in Judge Marschner's court order be made a continuous body to fix fares annually and was objected to on the ground that it tied the city up with the railway for an indefinite period of time.

Councilman Bradley's new resolution proposing that the board of arbitration shall exist only during the period named in the court order—nine months—and not for an indefinite period as contemplated in the orginal resolution. failed to pass by a tie vote of four to four at the meeting on June 24.

Abner E. Larned, president of the Street Railway Commission, asked the Council for a joint meeting at which New York subway experts could speak on the proper policy to be maintained between the surface and rapid transit lines. This request will probably meet with approval.

#### SIXTY CENTS IS MAXIMUM

Service has been resumed on all lines, the only difference from conditions before the strike being the absence of workingmen's tickets and the tickets on the 3-cent lines. The use of these tickets ended on June 21.

The employees of the Detroit United Railway are now excluded from the railway controversy and are apparently satisfied with thier new rate of pay. They are paid 50 cents an hour for the first three months, 55 cents an hour for the next nine months, and 60 cents an hour thereafter, instead of 65 cents an hour after one year's service, as was originally stated.

Apparently the Mayor had made up his mind in advance that he would consent to no fare in excess of 5 cents and when the city's investigators, including Barclay Parsons & Klapp, made their detailed reports these were not made public or furnished to the railway. It is believed that had these been published they would have clearly shown that the depreciation allowance finally presented by the accountants, not engineers, were not sufficient. As a matter of fact the company's depreciation charges, or rather estimates were cut for no other purpose than to make it appear that the business could be conducted at a profit on the 5-cent fare. Depreciation was based practically upon the allowance of the company last year, not upon the actual requirements, although President Brooks of the railway had frankly told the city that because of low fares money that should have gone to depreciation had to be used for wages and to meet operating expenses of like nature.

The *Free Press* of June 19 published an editorial under the caption "City Wants Service," which would seem to indicate a change in sentiment among office holders. That paper said in part:

> If the Common Council as a whole is swinging around to the view of the street car question indicated in the letter written by President John C. Lodge to George H. Barbour, it is taking a course that promises solid benefit to Detroit, a course that ought to meet with thoughful public approval.
>
> The Detroit United Railway as a political issue is worn out. The people are heartily tired of the once popular game of "baiting the company," for indulgence in that pastime has brought no benefit, except to politicians, and it has cost Detroit a great deal of money and has hampered progress. Detroit has always been the "goat."
>
> What the residents of this community of a million want now, is reasonable co-operation with the railway by the city government, and in return decent treatment and reasonable service from the company. They made this clear throughout the period of the recent street car strike.
>
> The talk about throwing the company off the streets is nonsensical. The project for a $10,000,000 bond issue for piecemeal building of municipal lines with which to carry on a long drawn-out fight against the railway is impractical and lacks the true constructive element. It savors of spite and Detroit has grown too big to induge in such pettiness. The council ought at once to rescind the bonding resolution it passed under pressure and in a moment of hysteria. Failure to rescind will necessitate a special election that will be an imposition on the patience and pocketbook of the public.

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### Muskogee Strike Unsettled

The strike of motormen and conductors of the Muskogee (Okla.) Traction Company, which was thought to have been settled two weeks ago, is still unsettled. The company agreed to most of the conditions submitted by the striking trainmen and an agreement was reached for the settlement of the trouble, but when the agreement was placed before the labor council its ratification was refused. The traction company thereupon attempted to operate cars, but strikers stoned the cars and rendered their operation without armed guards impossible.

Owners of the railway have come to Muskogee in an effort to bring the opposing factions together and effect a settlement of the strike. Conferences will be held with the striking trainmen in an effort to reach a temporary agreement under which cars may be kept running while minor differences are threshed out.

## Municipal Men Want Raise

### Superintendent of Seattle Lines Announces His Opposition to Recently-Formulated Request

Proposing increases in the wage of trainmen and shopmen of the Seattle (Wash.) Municipal Railway amounting to about $1,000,000 a year, representatives of the union have filed with Thomas F. Murphine, superintendent, a new wage scale which the City Council will be asked to make effective, beginning on Aug. 1.

Mr. Murphine has advised the union representatives that he cannot recommend the proposed increase to the City Council, stating that it would be impossible to get the money for the advance asked. In a letter to the trainmen he states that while it is true that an increase of 1 cent in the fare would mean $1,000,000 more a year if everybody now riding would continue to ride, the experience of other cities shows that 20 per cent increase in fares has brought only 10 per cent increase in revenues.

Detailed estimates of the effects of the proposed wage advance on the operating expense of the different departments, show an increase in operating expenses of $751,773 in the transportation division; $108,628 in the road division, and $98,763 in the shop division. With other items of cost, these estimates aggregate more than $1,000,000.

### A $6-DAY ASKED

The proposed schedule provides for a wage of $5.50 for conductors and motormen during the first six months service, and $6 a day thereafter, operators of one-man cars and gripmen on cable cars receiving an additional 50 cents a day. When the city took over the lines on April 1, trainmen were being paid 46, 48 and 50 cents an hour. The wage was immediately raised to $4.25, $4.50 and $4.75 a day, the present scale. Operators of one-man cars and cable cars received an additional 5 cents an hour. Under the new schedule, extra men would be guaranteed a monthly wage of $110 instead of $90, as at present; trainmen breaking in students would be paid $1 a day additional instead of 25 cents now paid; all trainmen would be required to take one day off in every eight days; and time and a half would be allowed for Sundays and holidays.

The new schedule further provides an eight-hour day; that employees in the train service working regular runs shall be guaranteed not less than eight hours for each day's work, with the exception of Sunday. Runs of seven hours or more are to be considered regular runs. Time and a half is to be paid for all work in excess of 8½ hours. Fifteen-day vacation is also asked. Substantial advances in the pay of shopmen are also requested. In his letter to the men Mr. Murphine said, in part:

> We shall not enter into a discussion of the merits of this proposed increase, nor of the cost of living, but shall confine our statement to the question of where the money is coming from to pay such increase.
>
> At the present time the amount derived from a 5-cent fare is sufficient to meet operating and other expenses such as interest, bond retirement, etc. If all passengers now riding were to pay an additional 1-cent fare it would mean an increase in revenue of approximately $1,000,000 a year, but experience in other cities has shown that the law of diminishing returns operates as soon as the fare is raised, so that a 20 per cent increase in fare in very few instances has increased the gross receipts more than 10 per cent, and any corresponding increase shows correspondingly diminishing returns.
>
> We do not believe that any fare charged at this time would bring in $1,000,000 additional revenue, and in order to pay this additional amount it would be necessary for the railway department to receive a subsidy or bonus from somewhere. As this is a matter that would require an entire change in policy in the operation of the city railway and is a matter primarily for the legislative body of the city, we at this time express no opinion.
>
> We answer your question in regard to the proposed increase negatively. We shall not recommend the same to the City Council.
>
> As you know, our only means of revenue is the fare obtained from passengers, which has been established and it has been the aim of this department to maintain it at 5 cents. The fact, we believe, of maintaining a 5-cent fare was the controlling factor of the purchase by the city of the railway system formerly owned by the Puget Sound Traction, Light & Power Company.

## Strike in Manila

A strike on the part of the employees of the Manila Electric Railroad & Light Company, at Manila, P. I., has been in progress during the past three weeks. The power plant workers were the first to go out. They were followed by about one-half of the trainmen and part of the shop and carhouse force.

During the early part of the disturbance 50 per cent of the regular cars were successfully operated under local police protection. Later on Acting Governor General Charles E. Yeater placed a detachment of the constabulary force of the Islands on duty in Manila as a precautionary measure against any possible trouble. Following this action the full regular car service was put on and has been effectually maintained since. Power house operation has been continuous, the work being handled by recruits from other departments.

There have been only slight evidences of violence, as the authorities have been watchful and have succeeded in suppressing any serious disturbance. The company's property has not suffered any damage.

No demands or grievances were presented by the employees to the company. The strike was put into effect without warning on advice of political labor agitators, whom the company refused to recognize. The general public and the press are unqualifiedly supporting the company in the position taken by it. Indications point to an early cessation to the strike as it is not meeting with the success anticipated.

This strike of the employees of the railway and light company is a reflection of the general labor unrest that has been in evidence in Manila recently, which made its appearance in the form of strikes on the part of dock workers and cigar makers.

## Rhode Island Men Ask More

### Want War Labor Board to Reopen Case in Which They Were Granted Increase Last July

The demand of the employees of the Rhode Island Company, Providence, R. I., for an increase in wages amounting to 62 per cent, which threatened to result in a strike, culminated in the union officials applying to the National War Labor Board for a decision in the case. This action was taken after the receivers of the Rhode Island Company had flatly refused to consider any demands for an increase in wages, insisting that the condition of the company financially precluded the possibility of an increase being granted. The receivers also refused to submit the subject to arbitration, stating that they were merely acting under orders of the Superior Court of Rhode Island and had no authority to resort to arbitration.

The National War Labor Board set June 23 as the date of the hearing, and on that day Examiner Charlton Ogburn of the board heard the attorney for the employees at a hearing in the City Hall, New York City. John J. Fitzgerald, attorney for the men, insisted upon a reopening of the case against the Rhode Island Company, a decision in which had been rendered last October. Examiner Ogburn expressed a doubt as to the authority of the War Board to reopen the case inasmuch as the case originally was against the Rhode Island Company whereas the property is at present being operated by receivers. Mr. Ogburn stated that he would forward the testimony with his recommendations to the War Board.

The receivers of the Rhode Island Company were not represented at the hearing, claiming that they had not been invited and expressing the opinion, further, that had an invitation been received they doubted their authority to appear without specific instructions from the court.

In the meantime, the employees have stated that there will be no strike pending the decision of the War Labor Board.

## Windsor Wages Adjusted

Employees of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., have accepted the terms suggested by the Ontario Railway Board. The board acting on the findings of the auditors who examined the financial status of the company, recommended the wage increase demanded by the men, and the 5-cent fare rate asked by the company.

The minimum wage provided is 40 cents an hour with a maximum of 50 cents and provides for 20 cents extra an hour for overtime. Formerly 6 cents extra an hour was paid for overtime.

Although Mayor Winter was hopeful that the border system would be purchased by the city and operated by the

Ontario Hydro-Electric Commission, negotiations which have been pending for about a year appear to be halted by the action of the Councils of Windsor and Walkerville in allowing the by-law to go to a vote of the people.

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission, is quoted as saying that the vote on increased fares to be taken on July 5, makes more valuable the franchises now held by the railway. Mayor Winter claime that the by-law if passed by the people will be binding for only one year and that the border cities are willing to hear any proposition the commission cares to make concerning the purchase of the lines before July 5.

### Railway Will Operate Buses

The Public Service Commission of Massachusetts has approved the petition of the Connecticut Valley Street Railway, Greenfield, Mass, to acquire and operate motor vehicles for the transportation of passengers between Greenfield and Montague. As explained previously in the ELECTRIC RAILWAY JOURNAL the proposed new service will be in addition to and will supplement the company's present car service. The rate of fare on the buses will correspond with the rate at present in effect on the cars of the railway, a minimum fare of 6 cents with a rate of 3 cents per mile. The company looks forward to this service as a means of preserving to the railway its legitimate business between these two points.

### A Tidbit

Here is delicious bit of verbal horseplay from a daily newspaper editorial:

> Of course, we know we're just an ordinary darn fool, with no knowledge of big business and no experience in handling large sums of money. Nobody credits us with having money or expects us to know anything about it, and in both instances the guess is good. We haven't and we don't.
>
> But being an ordinary darn fool, we've got the hunch that since a lot of other darn fools, ordinary and fancy, have tackled the street car problem and messed it up, we've a right to offer a solution.
>
> The other day, while playing golf we gave considerable thought to the local transportation problem, and its present pitiable plight. We dubbed several shots in consequence, but we are glad to make that sacrifice for the public welfare. We have several methods whereby the local railway may be driven off our streets forever; not just temporarily, but forever!
>
> First, if everybody, for the glorious good name of the city will agree to walk to work, there will be no need of street cars. All the workmen will have to do is to get up two or three hours earlier in the morning and set their evening meal two or three hours later in the day, and the trick is done. Why pay an extra cent for a transfer, when you can walk 8 miles and change from the shady to the sunny side of the street as often as you wish, without charge?
>
> But it occurs to us that there may be many weak-kneed, spineless, subservient and timid citizens, willing for the sake of their own comfort and convenience to knuckle down to the local railway and actually ride on its trolley cars if they have the opportunity. Shame on them for their lack of devotion to a high ideal and their city's welfare. Cowards and poltroons are they who must have trolley transportation to their daily toil! Why, we wonder, were they given legs and feet?
>
> For them, however, we have a splendid plan. We shall have no more dickerings with the railway. We shall establish an airship system.

## News Notes

**Youngstown May Increase Operating Allowance.**—Following a request from the Mahoning & Shenango Railway & Light Company for an increase in operating allowance from 22 to 31 cents a mile, Street Railway Commissioner W. L. Sause, of Youngstown, Ohio, has recommended an increase to 27 cents.

**Lake Shore Men Granted an Increase.**—Employees of the Lake Shore Electric Railway, Cleveland, Ohio, were granted an increase in wages on June 5. Those on the interurban line will receive an advance of 3 cents an hour and those on local lines, 2 cents an hour. The new schedule becomes effective at once.

**Reno Men Want More.**—An increase in wages from a basic pay of 28 cents an hour to 40 cents an hour and a ten-hour day, with time and a half for overtime, are demanded by the trainmen of the Reno (Nev.) Traction Company in a petition handed Manager R. C. Leeper by a committee of the men. The shopmen and the road men have handed in a similar petition asking for an increase of 50 cents a day for each employee.

**Beaver Valley Men Ask Wage Inquiry.** — The Beaver Valley Traction Company, operating in Beaver Falls, Pa., and its employees have presented a joint petition to the War Labor Board, asking that it investigate conditions and decide if there should be an advance in the scale of wages paid the employees, from May 1, 1919. The company at present is paying 39, 41, 43 and 47 cents. The board has announced it will send an examiner to Beaver Falls about July 6.

**Will Arbitrate Matter of Extensions.**—The Cincinnati (Ohio) Traction Company has agreed to arbitrate its differences with the Interurban Railway & Terminal Company, which are causing a delay in the extension of the local line to Kennedy Heights and Pleasant Ridge. It is understood that arbitration is satisfactory to the Interurban Railway & Terminal Company. The matter will be taken up as soon as C. W. Culkins, street railroad commissioner, is officially notified to this effect by the company.

**Wage Arbitration in Little Rock.**—Rev. Hay Watson Smith has been accepted by the Little Rock Railway & Electric Company, Little Rock, Ark., as the third arbitrator to complete the arbitration committee to make a settlement of the demands of the employees for a flat rate raise of 20 cents an hour. The men are at present receiving a maximum of 35 cents an hour and a minimum of 30 cents. The raise was asked by the men on April 14, 1919, to become effective May 22. The company denied the request, offering a raise of 4 cents an hour. This was promptly turned down. A strike ultimatum was delivered to the company as the last means to effect a settlement.

**Completing Hydro-Electric Plans.**—The Ontario Hydro-electric Commission of Canada will start construction work soon on the proposed hydro-radial line between Port Colborne, Ont., and Bridgeburg, Ont., a distance of about 25 miles. This line will skirt the Canadian shore of Lake Erie, touching all of the popular summer resorts. The line would connect with Buffalo via the bridge across the Niagara River at Bridgeburg. It is proposed to start the work at the Bridgeburg end and rush the building of the line to Fort Erie and then to Crystal Beach before work is attempted between Crystal Beach and Port Colborne. The work will be done by the Dominion government under the direction of Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission.

**Paving Controversy Settled.** — The long-standing controversy between the city of Pittsburgh and the Pittsburgh (Pa.) Railways over the paving of Chartiers Avenue and West Carson Street has been settled. At the conclusion of a hearing during the week ended June 21 before Referee W. R. Blair, serving as master for the United States District Court, under which a receiver is operating the Pittsburgh lines, it was announced that the paving will be done. The company will spend, as its share of the cost, $103,614, subject to the approval of the federal court. The matter has been contested bitterly for a long time, the company contending it did not have the money to pay for its proportion of the cost. Finally the argument centered about the quality of construction to be used, the company standing firm for the cheapest way out. This was compromised.

**Co-operative Course in Electrical Engineering.**—A co-operative course in electrical engineering, conducted by the Massachusetts Institute of Technology and the General Electric Company, established in 1917 but dropped last year, has been revived with the close of the war. The course covers a period of five years, of which the first two are identical with the established course in electrical engineering at the institute, and the last three are divided between instruction at the institute in Cambridge and experience associated with instruction at the West Lynn and other works of the General Electric Company. The work of the final year of the course is of advanced nature, with emphasis laid on the problems of administration, the design and development of engineering projects, and in creative work, such as research. The course leads to the degree of Master of Science and the number of men admitted each year is limited to forty.

# Financial and Corporate

## Segregation Seems Likely

### Court Announces New York Leased Lines Will Be Returned to Owners if Rental Is Unpaid

Judge Mayer in the Federal Court in New York announced on June 25, after a long discussion by lawyers representing various interests, that if the New York Railways could not pay its rentals for the Eighth and Ninth Avenue lines, they would be returned to their owners. That the company cannot pay the rentals and interest on bonds due on July 1, and have capital enough left to carry on the business, was announced by Job E. Hedges, the receiver, in an application asking the court for instructions in the matter.

Morgan J. O'Brien, representing the Eighth and Ninth Avenue lines, complained of the default in rental payments, and asked that the lines be turned back. The owners, he said, would accept the rentals if they were offered, but as the amount grows larger each day, with the prospects of payment remaining stationary, he thought the owners should have their properties. An effort would be made to operate them at a profit.

#### COURT EXPLAINS ISSUES INVOLVED

Under the lease to the New York Railways a rental of $215,000 a year was to be paid for the Eighth Avenue line. This, with other costs, would bring the annual payments up to $265,675. Rent on the two lines is due for the first quarter of the year.

In reply to a question by Judge Mayer, Mr. O'Brien said he thought there would not be much difficulty in arranging for transfers between the Eighth and Ninth Avenue lines and several crosstown lines. Judge Mayer told him that if he would submit a plan by July 8 showing that the interests of the public would be safeguarded he would instruct the receiver to turn over the lines. Judge Mayer said:

> The time has come when we must have more action and less talk. The court wishes to keep the system intact, but it has no right to destroy property. The New York Railways is running at a deficit every day. There is no doubt about that. Public Service Commissioner Nixon has indicated that he will take up the matter of transfers, and I presume he will give an answer at an early date. I believe the solution of the transfer problem will mean the solving of the problems we have been considering.
>
> As for the Eighth and Ninth Avenue lines, we know we cannot pay the rentals, and we have no right to keep the property running at a loss. The owners promise to run the cars in a way that will serve the public if we return them. The responsibility of breaking up the property cannot be charged to the court, which is not going to take money out of the pockets of the owners of the lines. If Judge O'Brien will present to me by noon on July 8 a satisfactory plan of operation I will instruct the receiver to return the lines.

Receiver Hedges also asked for instruction as to what action he should take regarding the payment of interest due on July 1 on the first real estate and refunding mortgage 4 per cent bonds, which amounts to $361,225, and the interest on the 5 per cent underlying bonds, as well as those of the leased lines. He said the system had been operating cars over the Williamsburg Bridge since Sept. 1, 1915, on temporary permits, and that during the six months ended March 31 last it had fallen short $1,210,011 of earning the interest on its bonds.

Joseph Cotton, in behalf of a committee of the first mortgage bondholders, who have $18,000,000 of the bonds, said he represented 1600 bondholders, each owning less than $10,000 of bonds. Their holdings, he said, represented their chief source of income. He said that a default in payment of interest would make it necessary to begin foreclosure proceedings. Asked by Judge Mayer if he would foreclose if the interest was paid, he replied that if offered the payment it would be accepted and marked "on account." Judge Mayer said:

> It seems inadvisable to instruct the receiver to pay this interest under the circumstances, since nothing will be gained. There is no course left to the court but to instruct the receiver not to pay it.

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## Abandonment Approved

The Public Service Commission, for the Second District of New York, on June 17 approved the declaration of abandonment by the Syracuse, Lake Shore & Northern Railroad, now the Empire State Railroad Corporation, of that part of its route on the East River Road, commencing at Riverside Cemetery in Scriba and running southerly to its present terminus.

The Syracuse, Lake Shore & Northern Railroad in 1911 asked the commission for approval of a declaration of abandonment of that part of its road on the east side of the Oswego River at Riverside Cemetery and running southerly to the bridge at Minetto. The declaration of abandonment relating to that part extending upon private right-of-way to the Minetto bridge was approved and abandonment of the remainder was disapproved.

The Empire United Railways, Inc., successor of the Syracuse, Lake Shore & Northern Railroad, in 1914 made application for approval of the declaration of abandonment as to the remainder of the route proposed to be abandoned in 1911. The commission refused approval without prejudice to renewal of the application and the Empire State Railroad Corporation filed the petition upon which the commission acted on June 17. There were hearings by Public Service Commissioner Irvine.

## Contests Receiver's Plan

### Trustee of B. R. T. Refunding Mortgage Objects to Displacement of Existing Liens

Arguments were begun during the week ended June 21 in the United States Circuit Court of Appeals on an appeal made by the Central Union Trust Company, New York, as a trustee under a first refunding mortgage of the Brooklyn Rapid Transit Company. The appeal is from an order issued by Judge Julius M. Mayer in May, 1919, authorizing the issuance of $20,000,000 of receiver's certificates in the interest of the Brooklyn Rapid Transit lines. The arguments upon which the trust company's appeal are based are as follows:

> 1. That the Brooklyn Rapid Transit Company is a private business corporation and no authority exists to displace existing liens upon its property by the issue of receiver's certificates without the consent of said lien holders.
> 2. That no authority exists to issue receiver's certificates in aid of the power plant project.
> 3. That no authority exists to issue receiver's certificates for the purpose of maintaining, rehabilitating, constructing or equipping the properties of other corporations controlled by the Brooklyn Rapid Transit Company.
> 4. That no authority exists to issue receiver's certificates at the expense of the first refunding mortgage bondholders for the purposes of benefiting the note holders.

The order authorizing the issuance of the certificates, against which appeal has been taken, was given on the basis that the money was to be expended for power facilities and other purposes, to the limit of $16,000,000.

The trust company objects to priorities granted, and it is further contended that the power equipment of the Brooklyn Rapid Transit Company is sufficient, and that the expenditure is contemplated so that the Brooklyn Rapid Transit Company may supply the power and other facilities which the subway company, the New York Municipal Railway Corporation, must furnish in order to perform its contracts.

Lindley M. Garrison, receiver, and Carl M. Owen for the company argued that unless the contract work of the New York Municipal Railway Corporation is completed its rights under the agreement of the company with the city of New York in connection with the operation of the new rapid transit lines will be voided. Mr. Garrison went into detail on the necessity of the money for the preservation of the property:

> If the Brooklyn Rapid Transit Company should cease its activities, it would be weeks and perhaps months before the surface lines and the elevated lines would be able to find substitute sources of power and find new agencies for the carrying on of their repair and maintenance work. In the meantime the public confusion and the public loss would be extreme.
>
> Unless this construction work is proceeded with, there is a possibility of serious default of the New York Municipal in the performance of its obligations under contract. The failure to complete this construction will jeopardize the vast investment of the Brooklyn Rapid Transit Company and the refunding bondholders in the New York Consolidated and the New York Municipal situation.

The court reserved decision.

## Net Income Cut in Half

### Twin City Lines Suffer from Higher Costs and Lower Transportation Revenues

The operating ratio (including taxes) of the Twin City Rapid Transit Company, Minneapolis, Minn., was 81.77 per cent for the calendar year 1918 as compared to 74.84 per cent for 1917, upon the basis of the total railway operating revenue and non-operating income. This big jump was due to the increased cost of labor and materials and to the decrease in traffic.

INCOME STATEMENT OF TWIN CITY RAPID TRANSIT COMPANY FOR YEARS ENDED DEC. 31, 1917 AND 1918

| | 1918 Amount | 1918 Per Cent | 1917 Amount | 1917 Per Cent |
|---|---|---|---|---|
| Revenue from transportation | $9,618,500 | 99.2 | $10,119,755 | 99.4 |
| Revenue from other railway operation | 77,479 | 0.8 | 62,111 | 0.6 |
| Total railway operating revenue | $9,695,979 | 100.0 | $10,181,866 | 100.0 |
| Way and structures | $1,005,629 | 10.3 | $1,031,215 | 10.1 |
| Equipment | 823,048 | 8.5 | 781,664 | 7.6 |
| Power | 1,132,335 | 11.7 | 1,047,484 | 10.3 |
| Conducting transportation | 3,142,150 | 32.4 | 3,031,123 | 29.8 |
| Traffic | 37,422 | 0.4 | 57,138 | 0.6 |
| General and miscellaneous | 873,961 | 9.0 | 816,845 | 8.0 |
| Transportation for investment — credit | 10,572 | 0.1 | 41,950 | 0.4 |
| Total railway operating expenses | $7,003,974 | 72.2 | $6,723,519 | 66.0 |
| Net operating revenue | $2,692,005 | 27.8 | $3,458,347 | 34.0 |
| Taxes assailable to railway operation | 936,451 | 9.7 | 916,196 | 8.0 |
| Operating income | $1,755,554 | 18.1 | $2,542,151 | 25.0 |
| Non-operating income | 15,215 | 0.2 | 25,846 | 0.2 |
| Gross income | $1,770,769 | 18.3 | $2,567,997 | 25.2 |
| Rent for leased roads | $3,000 | 0.0 | 3,000 | 0.0 |
| Interest on funded debt | 1,034,428 | 10.7 | 989,724 | 9.7 |
| Net loss miscellaneous physical property | 27,333 | 0.3 | 25,586 | 0.3 |
| Miscellaneous debits | 14,706 | 0.1 | 11,636 | 0.1 |
| Total deductions | $1,079,467 | 11.1 | $1,029,947 | 10.1 |
| Net income | $691,302 | 7.2 | $1,538,050 | 15.1 |

The transportation revenues during 1918 declined $501,255 or 4.9 per cent. The causes assigned by the company were the exodus of young men for military service, the lack of community prosperity based on large war contracts, and the influenza epidemic. The operating expenses rose $280,455, or 4.2 burdens caused the next income to drop $846,748, or 55 per cent.

More ground was lost through a slight increase in taxes, through a decrease in non-operating income and through larger deductions from gross income. The combination of all these burdens caused the net income of the company to drop $846,748, or 55 per cent during 1918.

The company has paid dividends upon its common stock since 1899 and has, from time to time, increased the rate until it reached 6 per cent in 1909. This rate, however, had to be reduced to 2 per cent in 1918. The profit and loss balance carried forward at the end of the year was $1,180,078, as compared to $1,285,804 the year before.

The expenditures for additions and replacements during 1918 totaled $188,981. The only large expenditures were for necessary reconstruction of track, some additional street paving, and the purchase of certain competing motor buses. Upon the purchase of these buses, competing bus lines were discontinued, and the company is now operating some of them in the northern part of the city of Minneapolis on a newly opened and paved street on which street cars are not operated.

The revenue passengers carried in 1918 numbered 188,930,268, as compared to 199,621,160 in 1917. The transfers redeemed in the two years were 67,985,059 and 73,678,873, respectively.

## Larger Loss in Boston

### May Returns Show Largest Deficit So Far in 1919, Although Cost per Passenger Decreased Slightly

The financial report for May, made public by the trustees of the Boston (Mass.) Elevated Railway, shows a deficit of $324,002 for the month, as compared with $316,392 in April and $285,124 in February, the worst preceding months in 1919. As in April, one of the reasons for the larger deficit was the excess of track and car repair work above a fair monthly average. The details appear herewith.

The revenue passengers in May totaled 29,967,223, and the total receipts from all sources were $2,453,191. Of this amount $2,385,156 was received from fares. The total cost of service was $2,777,194, of which $1,316,416 was expended for wages. The cost of labor per revenue passenger was 4.393 cents.

The total cost of service per revenue passenger for May was 9.267 cents, as compared with 9.328 cents in April, 8.923 cents in March, 9.304 cents in February, 8.970 cents in January and 9.026 cents for the eleven months ended May 31, 1919.

Receipts per revenue passenger in May were 8.186 cents. The receipts under the 8-cent fare in May, 1919, as compared with the 5-cent fare in May, 1918, showed an increase of $738,177, or 44.82 per cent. This compared with an increase of 45.96 per cent in April, 42.32 in March, 44.91 per cent in February and 43.77 in January.

RECEIPTS AND COST OF SERVICE OF THE BOSTON ELEVATED RAILWAY FOR MAY, 1919

| | |
|---|---|
| Receipts: | |
| From fares | $2,385,157 |
| From operation of special cars, mail pouch service, express and service cars | 9,243 |
| From advertising in cars, on transfers, privileges at stations, etc | 24,949 |
| From other railway companies for their use of tracks and facilities | 4,187 |
| From rent of buildings and other property | 6,193 |
| From sale of power and other revenue | 11,613 |
| Total receipts from direct operation of the road | $2,441,343 |
| Income from deposits, income from securities, etc | 11,848 |
| Total receipts | $2,453,191 |
| Cost of service: | |
| Maintaining track, line equipment and buildings | $487,612 |
| Maintaining cars, shop equipment, etc | 226,514 |
| Power (including 22,778 tons of coal at $5.633 or $128,314) | 194,096 |
| Depreciation | 167,000 |
| Transportation expenses (including wages of car employees, carhouse expenses, etc.) | 835,904 |
| Salaries of administrative officers | 7,583 |
| Law expenses, injuries and damages, and insurance | 102,556 |
| Other general expenses | 71,696 |
| Total operating expenses (of which $1,316,416 represents wages) | $2,092,961 |
| Taxes, proportion | 80,762 |
| Rent for leased roads (exclusive of subways) | 215,969 |
| Proportion of rent of subways and tunnels, to be paid to the city of Boston, exclusive of Cambridge Subway, owned by company | 125,934 |
| Interest on Boston Elevated bonds and notes | 140,009 |
| Miscellaneous items | 4,561 |
| Proportion of dividends under acts of 1918 | 116,998 |
| Total cost of service | $2,777,194 |
| Net loss | $324,003 |

## Abandonment Petition Denied

The Public Service Commission of New Hampshire has denied the application of the Portsmouth Electric Railway for permission to abandon permanently its North Hampton branch and to discontinue temporarily during certain months of each year the so-called North Beach branch, saying:

> Nothwithstanding the poor financial showing of this road we have seen that it did not ask for an increase of rates until August, 1918, when it increased the fares from 5 cents to 6 cents and put into effect a 2-cent transfer charge. In February, 1919, it further increased the fares from 6 cents to 7 cents, retaining the 2-cent transfer charge. These new rates obviously have not been in effect long enough to tell with any degree of certainty just how they will affect the revenue. To allow the road to take up its tracks before it has been ascertained for a fact that the road would not pay would be unjust to the public. If, however, under the present rates, or even higher rates, the road cannot be made to pay what its owners are legally entitled to receive, then the road can renew this petition.

## Finances Before Commission

### Some Details Made Public of Readjustment Plan of the United Railroads of San Francisco

The plan for the readjustment of the finances of the United Railroads, San Francisco, Cal., has been agreed upon by the different interests involved and is now before the California Railroad Commission for approval. Approval by the commission will complete efforts toward a financial readjustment, which has been a matter of negotiation for more than four years.

Under the plan now agreed upon, the total bonded indebtedness of the company will amount to approximately $15,000,000, less than half of the present funded debt. Of the $15,000,000 funded debt proposed in the new plan, approximately $10,500,000 will be in the form of 5 per cent Market Street Railway bonds. There are now outstanding $7,098,000 of these bonds and it is proposed to issue about $3,525,000 additional. Following the bond issue will be a note issue of approximately $5,000,000. There will be issued about $11,750,000 first preferred stock. Second preferred and common stock will also be authorized and issued.

There are outstanding $23,500,000 of 4 per cent sinking fund bonds of United Railroads and it is around these and the question of what provision will be made for them that interest centers. There are also underlying bonds amounting to $12,298,000 which will have to be taken care of. These include $7,098,000 Market Street Railway 5 per cent bonds. These bonds will remain a lien on the property and, as stated above, approximately $3,525,000 additional will be issued. Of the remaining $5,200,000 underlying bonds, the majority are in default as to principal though interest is being paid regularly. It is believed that the short-term notes will be sold and that proceeds will be used to retire the $5,200,000 underlying bonds.

Under the plan as now drawn up, holders of the sinking fund 4 per cent bonds will receive 15 per cent of the par value of their holdings in the new Market Street Railway 5 per cent bonds to be issued. First preferred stock to the extent of 50 per cent will be given to holders of the 4s, and the balance, amounting to 35 per cent, will be made up by second preferred and common stock.

## Arranging Sale of Grafton Property

The trustee in bankruptcy of the Grafton (W. Va.) Traction Company and associated companies, Dr. T. F. Lanham, Grafton, has filed a petition in the United States District Court for the Northern District of West Virginia, praying for an order authorizing the sale of the electric railway property and the property of the affiliated companies, either at public auction or by private sale.

It seems to be a recognized fact that the Monongahela Valley Traction Company, which operates in Marion and Harrison Counties, will in all probability be a bidder for the property in the event of a sale. This would undoubtedly result in joining Grafton with Clarksburg and Fairmont in an interurban railway loop that would prove most convenient and desirable for each of the cities mentioned.

The petition for the sale of the property will be heard at a creditors' meeting to be held in the office of I. E. Wyckoff, referee in bankruptcy, on June 30.

## Change in Ownership at Sistersville

Ownership of the Union Traction Company, Sistersville, W. Va., and the Sistersville Electric Light & Power Company has passed to Boston capitalists. The business will be conducted under the name of two companies, the Sistersville & New Martinsville Traction Company and the West Virgina Power Company.

The power plant in Sistersville will be moved to Paden Park early next year, and important improvements are being worked out for Paden Park, which will make it one of the most popular and convenient pleasure resorts in that part of the Ohio Valley.

The extension of the road above New Martinsville to Clarington, or better still to Moundsville, where connection could be made with roads to Wheeling and other points, is one of the improvements that will vastly increase the revenue of the road and will be a great benefit to New Martinsville.

The Sistersville & New Martinsville Traction Company, the successor company, has been incorporated with a capital stock of $500,000 by R. Broadwater, W. J. McCoy, Nell Burns McCoy, W. R. Reitz and E. C. King, all of Sistersville.

## Change in Control

The controlling interest in the Pittsburgh, Harmony, Butler & New Castle Railway changed hands during the week ended June 21, when David McCahill, Pittsburgh attorney, purchased the holdings of R. H. Boggs. The properties involved in the deal, which include control also of the Pittsburgh, Mars & Butler Railway, the Harmony Electric Company and the North Pittsburgh Realty Company, all affiliated concerns, are appraised officially at between $8,000,000 and $9,000,000. Mr. McCahill and Mr. Boggs declined to state what the consideration in the transaction had been.

Mr. McCahill has been elected president of all the companies, succeeding Mr. Boggs in that office. The latter will remain on the directorate, however. The new president has taken personal charge of the properties and has announced that he will improve service and may purchase new equipment.

The lines involved in this sale were built in 1905-1906. Mr. Boggs, who is one of the proprietors of the Boggs & Buhl store in Northside Pittsburgh, headed the movement which resulted in their construction, as a matter of public spirit. The cars pass the doors of the store and undoubtedly have extended the Pittsburgh shopping radius to include thousands to whom the city stores otherwise were unavailable. While never much of a success financially, the railways have always served the public well and have contributed greatly to the development of a great area north of Pittsburgh. Mr. Boggs has retired from the public utility field because of poor health and the claims of his other business interests.

## Deficit for Calgary in 1918

The 1917 surplus of the Calgary (Alta.) Municipal Railway, amounting to $21,493, was during the calendar year 1918 turned into a deficit of $7,118. The comparative report for these two years follows:

| | 1918 | 1917 |
|---|---|---|
| Car earnings | $606,188 | $556,375 |
| Miscellaneous earnings | 10,926 | 7,686 |
| Bank interest | 20,465 | 18,493 |
| Total | $637,579 | $582,554 |
| Operating expenses | $419,682 | $356,096 |
| Fixed charges, etc | 225,015 | 204,965 |
| Total | $644,697 | $561,061 |
| Deficit | $7,118 | ........ |
| Surplus | ........ | $21,493 |
| Car-miles | 2,735,264 | 2,739,923 |
| Car-hours | 279,109 | 279,584 |
| Fare passengers | 12,928,882 | 13,606,663 |
| Transfers | 3,796,960 | 3,830,702 |
| Total passengers | 16,725,482 | 17,437,365 |
| Average fare, revenue passengers (cents) | 4.687 | 4.023 |
| Average fare, all passengers (cents) | 3.696 | 3.139 |
| Average daily receipts | $1,954 | $1,596 |
| Average daily operating expenses | $1,203 | $975 |
| Average daily total expenses | $1,820 | $1,537 |
| Percentage of operating expenses to revenue | 71.2 | 61.1 |
| Cost of power per car-mile | 3.368c | 3.253c |

The report states that all taxes were paid and that allowances were made for sinking fund and depreciation. During 1918 unlimited tickets were sold six for 25 cents, and twenty-five for $1; workmen's tickets, good 6 to 8 a.m., eight for 25 cents; school children's tickets, ten for 25 cents. In consequence of the deficit, fares were raised May 14.

The new schedule provides for a 5-cent cash fare. Tickets are sold five for 25 cents, or twenty-two for $1. Workmen's tickets have been abolished. Children's tickets are sold eight for 25 cents.

## A Question of Control

The Ministry of Ways and Communications bill is slowly struggling through the committee stage in Parliament. As regards tramways, the only important point made is that the government has promised to consider whether it will accept a modification which will put municipally-owned tramways to a certain extent under the control of the new ministry. As the bill at present stands, such tramways—unlike all other public means of locomotion—are not brought under control. In reference to the supply of electricity, which in addition to means of transportation it is proposed should come under the new ministry. The government has accepted an amendment deleting electric supply from the subjects in regard to whether the existing powers of government departments should be transferred to the ministry. The government, however, has not abandoned its intention. The provision as to supply of electricity had been included in the bill on the assumption that by this time the question would have been largely settled under another bill to be introduced for the purpose of setting up a national electric power supply. The latter bill has, however, been delayed owing to the illness of the president of the Board of Trade (Sir Albert Stanley). The government now intends that the bill will make provision for the whole subject, including the transfer of existing powers to the Ministry of Ways and Communications.

## Financial News Notes

**Co-Receivers for Atlantic City Line.**—Stern & Silverman, Philadelphia, Pa., will probably be named as co-receivers with A. J. Purington, receiver of the Atlantic Shore Railway Company, Atlantic City, N. J., who succeeded former Judge Clarence L. Cole in that office.

**Abandonment Threatened.**—It is reported that the North Coast Power Company may abandon electric railway service between Centralia and Chehalis, Wash. The action was threatened if steps are not taken by the two cities to relieve the jitney competition, which has made it impossible to operate the electric railway at a profit.

**Boise Road Sold.**—The property of the Boise (Ida.) Railway, including the city electric line in Boise, subject to a $75,000 mortgage on the Natatorium, has been sold under hammer. The railway company's equipment was sold to S. F. Watts of Independence, Kan., for $100. It is understood the new owner plans to improve and restore the property.

**Providing Municipal Railway With Funds.**—Ordinances have been introduced in the City Council of Seattle, Wash., providing for two loans aggregating $500,000 to the Seattle Municipal Railway betterment fund, for the purpose of speeding up improvements and extensions to the municipal railway system. One ordinance provides for borrowing $250,000 from the general fund, and the other $250,000 from the street railway fund. The loans are to be repaid in September from the proceeds of the $790,000 bond issue recently voted for betterments to the railway system.

**Receiver's Appointment Made Permanent.** — Cornelius S. Sweetland, treasurer of the United Traction & Electric Company, Providence, R. I., who was named temporary receiver of the company on petition of the Central Trust Company, New York, was made permanent receiver of the company in the Superior Court of Rhode Island by Presiding Justice Tanner, on June 23. The developments leading up to the filing of the petition by the Central Trust Company were detailed in the ELECTRIC RAILWAY JOURNAL for June 21. Mr. Sweetland was instructed by Justice Tanner to take over the affairs of the company and operate it under instructions from the court.

**Columbus Notes Offered.**—Stone & Webster, Boston, Mass., are offering for subscription $1,750,000 of three-year 6 per cent gold coupon notes of the Columbus (Ga.) Electric Company, which is under the direction of the Stone & Webster Management Association. The notes are dated July 1, 1919, and are due July 1, 1922. They are in the denomination of $1,000, $500 and $100. The proceeds from the sale of the notes will be used to retire the present $1,500,000 of 6 per cent notes due on July 1 and also to take up the floating indebtedness of the company, now amounting to $170,000, which has been incurred for additions and extensions to the company's plant. The present net earnings are almost double all interest charges.

**Notes to Pay for Cars.**—Public Service Commissioner Lewis Nixon of the First District of New York has announced that he will shortly approve an order to permit the surface line companies of the Brooklyn Rapid Transit system to issue lease warrants or notes for 80 per cent of the value of 200 of the 300 new cars which the company must buy, by order of the commission. Before his approval is granted the company must submit schedules of the principal and interest amounts which are involved. The companies are to pay 20 per cent of the value of the cars in cash, each car to cost $5,600. The total cost, including interest and discount, it was stated by A. M. Williams, of counsel to the Brooklyn Rapid Transit companies, would amount to $1,245,696.30.

## Electric Railway Monthly Earnings

BATON ROUGE (LA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $27,371 | *$17,402 | $9,969 | $3,474 | $6,495 |
| 1m., Apr., '18 | 20,816 | *10,403 | 10,413 | 3,279 | 7,134 |
| 12m., Apr., '19 | 299,786 | *172,751 | 127,035 | 42,116 | 84,919 |
| 12m., Apr., '18 | 237,946 | *124,390 | 113,556 | 38,616 | 74,940 |

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $46,455 | *$33,316 | $13,139 | $5,354 | $7,785 |
| 1m., Apr., '18 | 37,674 | *27,986 | 9,688 | 5,255 | 4,433 |
| 12m., Apr., '19 | 542,625 | *408,776 | 133,849 | 63,674 | 70,175 |
| 12m., Apr., '18 | 480,141 | *333,326 | 146,815 | 63,221 | 83,594 |

COLUMBUS (GA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $100,248 | *$46,657 | $53,591 | $30,443 | $23,148 |
| 1m., Apr., '18 | 94,223 | *39,514 | 54,709 | 28,200 | 26,509 |
| 12m., Apr., '19 | 1,189,571 | *614,382 | 575,189 | 352,125 | 223,064 |
| 12m., Apr., '18 | 1,149,762 | *454,419 | 695,343 | 318,767 | 376,576 |

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $109,133 | *$67,384 | $41,749 | $12,969 | ‡$28,905 |
| 1m., Apr., '18 | 89,317 | *51,409 | 37,908 | 11,811 | 26,097 |
| 12m., Apr., '19 | 1,220,183 | *733,725 | 486,458 | 153,368 | ‡335,115 |
| 12m., Apr., '18 | 975,911 | *545,543 | 430,368 | 132,633 | ‡322,306 |

EL PASO (TEX.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $124,652 | *$86,766 | $37,886 | $7,411 | $30,475 |
| 1m., Apr., '18 | 102,665 | *69,344 | 33,321 | 6,441 | 26,880 |
| 12m., Apr., '19 | 1,329,995 | *944,033 | 385,962 | 82,819 | 303,143 |
| 12m., Apr., '18 | 1,274,797 | *823,650 | 451,147 | 70,561 | 380,586 |

GALVESTON-HOUSTON ELECTRIC COMPANY,
GALVESTON, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $247,480 | *$178,453 | $69,027 | $38,027 | $31,000 |
| 1m., Apr., '18 | 205,083 | *136,577 | 68,505 | 29,564 | 38,941 |
| 12m., Apr., '19 | 2,860,162 | *2,044,651 | 815,511 | 366,405 | 449,106 |
| 12m., Apr., '18 | 2,265,272 | *1,482,279 | 782,993 | 339,181 | 443,812 |

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $24,629 | *$17,003 | $7,626 | $6,065 | $1,561 |
| 1m., Apr., '18 | 25,900 | *16,396 | 9,504 | 6,119 | 3,385 |
| 12m., Apr., '19 | 310,281 | *213,076 | 97,205 | 73,396 | 23,809 |
| 12m., Apr., '18 | 340,899 | *217,869 | 123,030 | 73,827 | 49,203 |

JACKSONVILLE (FLA.) TRACTION COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $85,353 | *$82,231 | $3,122 | $14,217 | †$11,095 |
| 1m., Apr., '18 | 74,329 | *50,116 | 24,213 | 14,130 | 10,083 |
| 12m., Apr., '19 | 1,003,103 | *829,108 | 173,995 | 178,026 | †4,031 |
| 12m., Apr., '18 | 749,634 | *512,744 | 236,890 | 168,781 | 68,109 |

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $259,594 | *$164,454 | $95,140 | $24,845 | ‡$79,877 |
| 1m., Apr., '18 | 267,913 | *157,422 | 110,491 | 25,277 | ‡94,797 |
| 12m., Apr., '19 | 2,886,615 | *1,911,250 | 975,365 | 300,847 | ‡789,517 |
| 12m., Apr., '18 | 2,932,282 | *1,646,832 | 1,285,450 | 309,852 | ‡1,042,681 |

PENSACOLA (FLA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $42,935 | *$34,941 | $7,994 | $8,005 | †$11 |
| 1m., Apr., '18 | 35,008 | *24,138 | 10,870 | 7,077 | 3,793 |
| 12m., Apr., '19 | 550,955 | *417,395 | 133,560 | 90,239 | 43,321 |
| 12m., Apr., '18 | 391,640 | *238,931 | 152,709 | 82,012 | 70,697 |

SAVANNAH (GA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $115,286 | *$96,855 | $18,431 | $24,512 | $6,079 |
| 1m., Apr., '18 | 92,579 | *62,704 | 29,875 | 23,079 | 6,796 |
| 12m., Apr., '19 | 1,251,005 | *966,065 | 284,940 | 288,357 | †3,417 |
| 12m., Apr., '18 | 1,035,134 | *694,962 | 340,172 | 274,204 | 65,968 |

TAMPA (FLA.) ELECTRIC COMPANY

| Period | Operating Revenue | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|
| 1m., Apr., '19 | $98,578 | *$61,143 | $37,435 | $4,546 | $32,889 |
| 1m., Apr., '18 | 84,863 | *48,347 | 36,516 | 4,264 | 32,252 |
| 12m., Apr., '19 | 1,124,069 | *664,653 | 459,416 | 52,540 | 406,876 |
| 12m., Apr., '18 | 997,955 | *574,859 | 423,096 | 49,761 | 373,335 |

* Includes taxes. † Deficit. ‡ Includes non-operating income

# Traffic and Transportation

## New York State Study

### Commission Calls for Statistics on Which to Base Inquiry into Results with Increased Fares

The Public Service Commission for the Second District of New York is taking steps to ascertain the effect of revenue changes in the operation of electric railroads in the second-class and third-class cities of the State, following permission by the commission to make increases in fare. It has asked railroads upon which fare rates have been advanced to furnish comparative monthly statements of passenger revenue, revenue passengers carried and car-miles operated each month since an increased tariff has been in effect, compared with the corresponding months of the prior year and in which lower fares prevailed. The commission has asked that this information be segregated between city and other operating divisions.

### MORE THAN FIFTY INCREASES

Passenger fares have been increased in more than half of the fifty second-class and third-class cities in the State, either by an advance from 5 to 6, 7 and 8 cents per passenger or by shortening of zones and increasing revenue in that manner. Petitions for authority to increase fares are pending in several cities. Increases in a number of instances have been granted for a period of one year because of the stipulations in local franchise amendments. There are longer periods in other cities while in some municipalities the increased fare is to prevail until its necessity no longer exists.

Increased rates have been permitted by the commission where thorough investigation has demonstrated that higher fares and more revenue were required to preserve public service and where local franchises and agreements stipulating a maximum fare were amended and authority given the commission to allow the increased fare upon proof of necessity.

### WANTS TO LEARN EFFECTS

The commission is seeking the information to learn the general effect of the increased fares upon the revenue and financial conditions of the roads where fare rates have been advanced and what decrease, if any, in the volume of travel has followed with the higher fares.

Roads operating outside municipalities have been permitted to increase fares by increased mileage rates and shortening of the fare zones. All increases permitted by the commission have been after a thorough study of general operating conditions of each individual line and the increased cost in operating conditions, including wages and materials, to electric roads during the war. The study it is proposed to make should prove extremely helpful, particularly at this time.

## Louisville Fares and Service

It is reported that a new ordinance to curtail service and reduce operating expenses for the Louisville (Ky.) Railway will be introduced at the next session of the General Council. Since the Council killed the original ordinance Mayor Smith has washed his hands of the entire affair. He was instrumental in introducing the original ordinance in favor of economies in operation rather than an increase in fares, but this was killed because a few scattered residents on the West Chestnut and Madison and one or two other lines had friends in the Council. It is said that under the new ordinance to be introduced the Chestnut-Madison and the Liberty-Bank lines will be continued, with a few of the short lines eliminated. Mayor Smith is quoted as stating that he was in favor of aiding the railway, but after being blocked in his efforts he is through.

T. J. Minary, president of the company, is quoted as having made the statement that the only hopes now are something unforeseen or help from the government.

In spite of franchises it is held that the railway is entitled to an increased fare, inasmuch as the question of wages was taken out of the company's hands.

## Independent Audit Shows Loss

The Tri-City Railway, Davenport, Iowa, operated at a loss of $35,029 for the first four months of 1919, according to the report of the David G. Fisher Company, auditors and utilities engineers, which has just completed a survey of the company's books.

The report shows that the company's profits for the year 1918 were $11,168, and that a dividend of 2 per cent was paid on the outstanding stock, which is listed at $250,000. The report was made at the expense of the company, the auditors being engaged by the Davenport City Council.

When the officials of the company appeared before the Aldermen a number of weeks ago and announced that they were operating at a loss and that it would be necessary for the people to vote an increase in fares, the Council agreed to lend its moral support to the matter if a survey of the books showed that the increase was justified.

While the fare charged by the company on all city lines is 5 cents, the average fare was slightly above 4 cents.

## Jersey Hearing Resumed

### Municipalities Begin Presentation of Testimony Drawn from Studies of Foreign Zone Practice

The hearings in regard to the proposed zone plan of fares for the Public Service Railway on its lines in New Jersey were resumed on June 23. The company and the commission had previously completed the presentation of their testimony. On the date mentioned the municipalities began their case.

The first witness called in their behalf was Walter Jackson, former associate editor and business manager of the ELECTRIC RAILWAY JOURNAL. His testimony had largely to do with practices with respect to zone fares in general, zone fare distances and zone fare collections, based on knowledge obtained by him in visits to Europe, the most recent one made during the past winter as the basis for articles which have appeared previously in this paper.

Mr. Jackson made it plain that he was a strong advocate of the zone fare. He also praised the Public Service Railway highly for the work that it had done in preparing the elaborate report on which its case for zone fares is predicated.

At the hearing on June 24 he asserted that jitney competition with the Public Service Railway could probably be abolished very largely by the installation of one-man safety cars with low rates of fare and more frequent service. In this connection he made a strong plea for close co-operation on the part of the commission and the many cities with the electric railroad. Asked by Commissioner Slocum if the installation of one-man cars would not necessitate a heavy capital expenditure, Mr. Jackson said that aside from the proved high rate of return it would be easy to raise capital for safety cars because they can be used wherever the gage is standard width whereas the old-time big car was of special length and width.

The witness argued in short for a flexible plan of zone fares made out from the standpoint of increasing short distance traffic rather than from the viewpoint of convenience in collecting fares and in bookkeeping. He also pointed out that an inflexible zone fare made no provision for changes in zone lengths to correspond with changes in cost of operation. In much of what Mr. Jackson said he reiterated statements made previously in articles in this paper, written over his name, to acquaint American electric railway managers with what has been done in Great Britain, where zone fares have been in use for many years.

Among the witnesses on June 25 were Robert H. Whitten, formerly with the Public Service Commission for the First District of New York, Mr. Jackson and Ralph S. Bauer, Lynn, Mass., merchant and a student of electric railway affairs. Mr. Bauer said electric railway operators lack the merchandising sense.

# Ten Cents in Pittsburgh

## New Rate Announced on June 23 Provides, However, for Tickets at Seven and One-Half Cents

A 7½-cent fare will be started in Pittsburgh on or about Aug. 1, the receivers of the Pittsburgh Railways announced on June 23. This rate is good only upon payment by tickets. Cash fare will be 10 cents. Present fares in Pittsburgh are 5 cents within an area of a radius of approximately 2 miles from the center of the city, and 7 cents for a ride of any length, any part of which is outside that area.

### TWO-AREA SYSTEM A FAILURE

City officials have announced they will oppose the proposed increase before the State Public Service Commission, but this will not prevent its taking effect. Under the law of Pennsylvania a public service corporation may change its rates upon thirty days notice to the commission. If there are objections these must be heard by the commission, but the new rates go into effect pending a decision. The decision of the commission may then be carried before the courts upon appeal. So to all intents and purposes announcement of intention by the receivers makes it certain the new charge will be levied.

A prominent feature of the announcement of the receivers is their declaration that the two-area system has proved a failure in Pittsburgh. In explanation of their abandonment of it, in the formal statement carrying the announcement of the new fare, they say that it is complex, difficult and expensive in administration. It has failed to produce the revenue the lines need and further, the receivers declare, it is unjust under Pittsburgh conditions.

Pittsburgh, they explain, was built up under the flat fare system. Adoption of the two-area plan thus was tantamount, in a way, to a breach of contract, in that it altered realty values, to the loss of many owners in the 7-cent area, who had paid for their property at a time when no one had any reason to expect there would ever be any fare differential against it. The receivers also take the stand that although congestion within a small area is to be desired from the standpoint of company profits, it makes better living conditions impossible and is ruinous public policy.

### CONCESSION ON TRANSFERS

A slight extension of the transfer privilege will accompany the new fare. Passengers boarding a car anywhere within the present 5-cent area, and paying a cash fare, will receive a transfer to any other line, good as far as the present 5-cent limit. This means transfers across the downtown district, something for which the Pittsburgh public has clamored for years. The only thing of that nature in effect now is a crosstown line, from the Northside business district through the downtown district, just across the Allegheny River, to which transfers are issued from all connecting lines.

Absolute necessity of more revenue is adduced by the receivers as justification for the increase. It is the cheaper alternative, in the long run, they argue. No bond interest payments or lease rentals have been made since last fall. As a result disintegration of the whole fabric of Pittsburgh transportation is threatened. One of the underlying companies of the Pittsburgh Railways, the Southern Traction Company, already has instituted proceedings looking to foreclosure of its mortgages on certain lines, the way having been opened for this by a recent decision of the Federal Court, under which the receivers operate the lines, that the right to such action cannot be denied. Since that decision the receivers have foreseen a time when each of the dozen or more underlying companies might attempt again to operate their lines independently. This, they set forth, would prove more costly to the public than the 7½-cent fare.

Rebate slips will be attached to tickets sold under the new rate and given to payers of cash fares. These will call for the return of difference between fare paid and the old 5-cent fare, the last rate which has the approval of the Public Service Commission, if the new rate is disallowed finally. Since 5 cents was the rate in Pittsburgh, a 5½-cent fare and the present 5 and 7 cents have been charged. Protests against these rates are still pending with the commission.

One reason for the early announcement of intention to increase—no declaration was necessary until the first of next month for an increase Aug. 1—was a desire to play absolutely fair with the platform employees, whose demands for a raise were scheduled to come up for argument before the War Labor Board in Washington on June 25, the receivers said. A fare increase was necessary whether or not the men got their raise, and the receivers did not wish to embarrass them in their effort.

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## St. Louis Fare Hearings Resumed

The Public Service Commission of Missouri will resume its hearing of the United Railways fare case the latter part of the present month and will then take up the question of wages.

At a hearing held at Hotel Statler, May 20, the commission took up the question of increased revenue for the company, and at the request of the city's representatives the cross-examination of Richard McCulloch president of the company, was continued for two weeks. When the case was called on June 5, the hearing was continued until June 24, in St. Louis.

The 6-cent fare which expired on June 1 was continued for sixty days on the city lines without opposition from the city counselor, who stated that if increased revenue is necessary the county lines, which still have a 5-cent fare, should bear their proportion of the burden. The commission announced that it would not fix a permanent fare until the revaluation of the company's property is completed, and this probably will not be before November. In the meantime the commission may make temporary changes in the rate of fare to meet the situation.

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## Arranging for Windsor Fare Vote

The action of the Council of Sandwich, Ont., in refusing to submit the by-law granting the Sandwich, Windsor & Amherstburg Railway increased fares has caused a break in the negotiatons started at the end of the recent strike of the railway employees. As the proposed by-law for Windsor as originally published was conditional upon the favorable vote on similar by-law by the voters of Sandwich and Walkerville, the action of Sandwich officials makes revision of Windsor's by-law imperative.

After members of the Council of Sandwich had decided that the proposed by-law would meet with certain defeat at the special election, and after a proposed amendment was defeated which provided for submitting the bill to the voters on condition that the company presented a statement of earnings to the municipalities, it was discovered by Mayor Winter of Windsor that the railway was already entitled to collect 5-cent fares in Sandwich under present franchise agreements. It was also found that the franchise provided for a one-fare zone for Sandwich passengers extending only as far as the Windsor Ferry docks.

It is believed that the Councils of Windsor and Walkerville will submit amended by-laws to the people at a later date than first planned, to fulfill agreements which caused the termination of the strike. The amendment to the Windsor by-law will withdraw the clause which states that the effect of the by-law is contingent upon passage of a like bill in Sandwich.

The original by-law as drafted for Walkerville provided that the right to vote was restricted to property owners and tenants with leases extending over the period of time covered in the financial obligation considered. This will be amended to give all voters a voice in the fare settlement.

The management of the railway has agreed to use any increase in fares granted by the people in meeting the demands of the men for higher wages. The company officials will be asked to attend the next meeting of the Council of Windsor and it is understood that the question of charging 1 cent each for transfers will be discussed with the view of getting the company to omit this charge from the increased fares asked.

## Watching Spokane Results

Fares in Spokane, Wash., will not go above 6 cents, but there is not much hope for a reduction until the lines of the Spokane Traction Company and the Washington Water Power Company are merged and the expense of operation reduced. This is the opinion of State Public Service Commissioner A. A. Lewis. Mr. Lewis is reported to have said:

> The commission fixed the ninety-day period for the 6-cent fare, first to give the companies and the city a chance to get together on the merger of the lines, and also to see what effect the increased fare would have on the returns of the companies.
>
> This ninety-day period will end on July 6, and I imagine the commission will grant a continuance if the interested parties need more time to carry out consolidation. The unification of the two systems, with the consequent elimination of competing lines and a reduction of the overhead expense, is the only solution of the situation, as the Public Service Commission sees it.
>
> It is safe to say, however, that no increase of fare above 6 cents will be granted by the commission, hence it is up to the railway companies to expedite the merger as much as possible. It is likely that the Public Service Commission will meet again to take the matter up some time before July 6.

J. S. Simpson, auditor of the Washington Water Power Company, has announced that the May report under the 6-cent fare shows an improvement over April.

## Ohio Commission Wants Facts

The Public Utilities Commission of Ohio has issued an order that all public utilities which have been granted increases in rates for service since May 1, 1918, must submit with any new schedules for further increases statements showing what improvements have been made to properties or service since the previous advances and what new conditions have developed to warrant the new rates proposed.

If these statements do not indicate that increased rates are warranted the commission will take steps to prevent their going into operation. It is said that a number of companies were preparing to file schedules of increased rates, although they were granted increases last year. The commission does not believe that operating expenses have increased since the armistice was signed. If anything, the members think they have diminished slightly. Therefore, they want the facts in all cases where additional increases are asked.

## Relief Committee Quits in Tacoma

Unable to see any solution to the electric railway problem in Tacoma, Wash., under present conditions, leaders in the committee of twenty-five have taken steps to close up the work of the committee and quit, passing the issue to the City Council and the company. Scott Z. Henderson tendered his resignation as chairman and also submitted a resignation from the committee he had sent to the Mayor, declaring that he saw no prospect of a possible settlement and that he had not the time to give to the problem. His resignation was accepted and H. G. Rowland elected in his place as chairman. Maurice Langhorne, one of the committee, said:

> This situation, in my judgment, calls for long and hard application on the part of somebody competent to work out a solution. Personally I believe the city has treated the company outrageously and that no company treated as this one has been by the city could ever make a success. It is for the City Council, the constituted authorities responsible for action, to take up the problem and settle it.

L. H. Bean, manager of the Tacoma Railway & Power Company, objected to the committee quitting without at least offering some recommendation to the Council. He said:

> We have been operating the lines under an agreement with the committee for ten months, and part of that agreement was that the committee, as the result of our furnishing it with all the information we could, make some recommendation for a final solution of the problem.

## Recent Women's Laws Not Oppressive

Miss Mary Van Kleeck, director of the woman-industry service of the Department of Labor, expects to file with the New York Industrial Commission a statement of the recently enacted law in New York state fixing the hours of labor of women which has been working to the detriment of employees of the Brooklyn Rapid Transit Company and its application based upon the results of investigations conducted by experts of the Federal Woman's Bureau in co-operation with the State Commission. The argument sets forth conditions in Chicago where women ticket agents have been successfully employed, on day shifts only, ever since the present transit system was established. Miss Van Kleeck points out that the plan in use in Chicago exists in a State where there is no law prohibiting night work for women. Miss Van Kleeck's statement in brief is as follows:

> Women have been successfully employed as ticket agents in Chicago since the establishment of the present transit system. They work shifts of eight hours with the prohibition of night work voluntarily adopted by the company in agreement with the trade union. The women's work is limited to two shifts falling within the hours of a day. The seniority rights of all the workers which give the privilege of choice of shifts are maintained by the establishment of one list for men and another for women. The men are entitled to select their shifts as their length of service permits, and the only difference between their seniority rights and that of women is that the women are not permitted to select the night shift.
>
> On the other hand, the prohibition of night work for women does not compel the men to work exclusively at night, since within the men's list the choice of day shift becomes possible. That this plan should have been adopted as a practical working scheme, when the Illinois law would have permitted night work, is very significant in showing the practicability of adjustment to comply with a night work law while retaining women in the position of ticket agents.

Governor Smith was waited upon on June 16 by twenty women railway employees from New York City in an effort to have him recommend that the special session of the Legislature repeal the Lockwood law regulating the hours of labor and working conditions of women employees. The Governor told the delegation that he would make no such recommendation. The women then appealed to the Republican leaders, who are said to have told them that members of the Legislature were helpless unless the Governor sent a special message to that body. This the Governor has refused to do.

## Statement About Cleveland Depot Promised

In response to a request of the City Council of Cleveland, Ohio, for a report on the status of the new depot plan, O. P. Van Sweringen, in an interview, stated that the railroads had one year in which to file declaration of intention to use the new depot and the year does not expire until Jan. 6, 1920. He expressed the belief that the railroads will not consume the year in making their intentions known. He said that considerable progress has been made in the development of the plans.

Some other railroad men said that in a proposition of this magnitude, involving the expenditure of $50,000,000 and the complete rearrangement of the city's steam and interurban systems, there are almost innumerable details to be worked out before all parties are satisfied. Some of the negotiations are of a very delicate nature and premature publication of reports might prejudice the best interests of both the city and all other parties concerned.

Those in charge of the promotion say they have taken the city authorities into their confidence as far as they consistently could.

# Transportation News Notes

**Increase of Fare in Cincinnati.**—Announcement was made by Street Railway Commissioner Caulkins on June 14 that the rate of fare on the lines of the Cincinnati (Ohio) Traction Company will be increased from 6 cents to 6½ cents on July 1.

**Hearing Set on Niagara Falls Fares.**—Chairman Hill of the Public Service Commission for the Second District of New York will hold a hearing on June 30 on the petition of the International Railway, Buffalo, for permission to charge a 7-cent fare in Niagara Falls.

**Fare Changes Not Determined**—Hearings in local communities served by the Eastern Massachusetts Street Railway will begin in the near future upon the rates of fare to be established by the public trustees of the road. Estimates of the revenue requirements of the company and probable earnings under different rates of fare were outlined at a recent hearing in Boston by Chairman Homer Loring, but no decision has been reached as to the fare schedule to be installed.

**Improvement in Reading Traffic.**—Ideal summer weather has resulted in a large amount of traffic over the lines of the Reading Transit & Light Company, Reading, Pa., to the several parks located in and about Reading. Carsonia Park, which is owned by the company and is located within a fifteen-minute ride of the business section, retains its leadership in popularity as the city's principal recreation place. Rining Rocks Park has also become more popular than ever under new management.

**Tacoma Company Wants Increase.** The Pacific Traction Company, Tacoma, Wash., has applied to the Public Service Commission at Olympia for permission to increase its fares outside the city limits, from 2 to 6 cents. Where 5-cent fares are now charged, the company proposes to ask 7 cents; 14 cents where 10 cents is charged; and 21 cents where 15 cents is the present tariff. Arthur R. Warren, Tacoma attorney in opposing the increase, states that a 42-cent round-trip from Steilacoom to Tacoma is prohibitive.

**Would Do Away with Charter Cars.**—The receivers of the Pittsburgh (Pa.) Railways are trying to arrange with city authorities for an agreement whereby the company may cease to operate "charter cars." Its franchises require continuous service over the lines covered, the penalty being nullification. For years cars have been run over abandoned lines once a day, to keep the franchises alive. As a measure of economy, the receivers wish to be relieved of this necessity, without forfeiture of franchise.

**Chicago Fare Matter in Court.**—The fight of the Chicago (Ill.) Surface Lines for a 7-cent fare has been taken into the courts. On June 19 an appeal from the ruling of the Public Utilities Commission was filed in the Sangamon County Court on a petition that the question be reopened. It is expected that the question of valuation will enter largely into the final outcome and the Chicago Surface Lines management is satisfied that an investigation will show that this exceeds the amount of the capital account.

**Accident on Brooklyn Elevated.**—Many persons were injured, two of them seriously, in a rear-end collision on the Broadway elevated line of the Brooklyn (N. Y.) Rapid Transit Company in Brooklyn, at 11:30 o'clock p.m., on June 23. A Canarsie-bound train made up of steel cars crashed into a Lexington Avenue train made up of wooden cars.

**Competing Bus Not Allowed.**—Holding that the Visalia Electric Railroad, Exeter, Cal., is capable of taking care of the traffic between Visalia and Lemon Cove, the Railroad Commission of California has denied the application of the Sequoia National Park Stage Company for a permit to operate an auto stage line between the two points. The stage company, however, may operate between Lemon Cove and the Sequoia National Park line during the months that the park is open and between Lemon Cove and Kaweah the rest of the year.

**Conditions Unbearable in Tacoma.**—It is reported that the Tacoma Railway & Power Company of Tacoma, Wash., plans to reduce wages, decrease the number of employees and curtail railway service, with possible abandonment of cars to outlying districts. The statement was made after the City Council had laid aside without action a report from the committee of twenty-five citizens appointed to investigate railway conditions. Louis Bean, manager, states the company is under unbearable pressure, and cannot hold out much longer.

**Permission to Renew Petition Reserved.**—The Public Service Commission for the Second District of New York has closed the petition of C. Loomis Allen and H. S. Holden, Syracuse, receivers, for permission to increase fares on the former Empire United Railways, Inc., in Auburn with permission to the Empire State Railroad Corporation, successor, to renew the application when it shall deem such renewal desirable. The application was not pressed before the commission because of franchise restrictions in Auburn and the decision in the Quinby case in Rochester.

**Rule of the Road Established.**—Corporation Judge Felix D. Robertson of Dallas, Tex., has ruled that automobiles and other vehicles must not pass cars while the latter are stopped for the purpose of taking on or letting off passengers, and that arrests for violations of this law can be made under the State highway law. It was generally believed that arrests could not be made under the State laws, but that only the city ordinance covering this practice applied. The holding of Judge Robertson will cause a curtailment of this practice, because the penalties under the State law are much more severe than under the city ordinance.

**Massachusetts Has Model Road.**—In the course of its lengthy finding which the Public Service Commission of Massachusetts has just made public and in which it upholds the fare schedule submitted by the Union Street Railway, New Bedford, in eliminating the transfer privileges on the Dartmouth & Westport division of the company the commission at the same time pays the management of the company the compliment of having the best managed electric railway property in the State. "Unique" is the word which the commission uses in referring to the efficient operation of the road.

**New Fares in Hull.**—The Hull (Que.) Electric Railway has announced a new fare tariff calling for a 5-cent increase to all points outside of Hull proper. The new tariff provides for a 20-cent fare from Ottawa to Deschenes, Aylmer and Queen's Park, or three tickets for 50 cents, forty-six tickets for $6; the trip to Red Gate or Rivermead and intermediate points will cost 15 cents, or two tickets for a quarter; the fare to Royal Ottawa Golf Club is placed at 10 cents straight, no commutation tickets. To Tetreauville and Bisson's Creek, which is inside the limits of the city of Hull, will be 10 cents straight. The fares from Ottawa to Hull remain unchanged, as do the special workmen's and school children's tickets.

**Suburban Increase Denied.** — Announcement of the decision of the Public Service Commission of West Virginia on the application of the West Virginia Traction & Electric Company for a raise in rates, has been made. The commission declined to raise the rates of the company from 10 cents to 15 cents. The towns of Edgewood, Woodsdale, Pleasant Valley and Elm Grove had protested, along with the city of Wheeling. The company wanted an additional fare zone in the territory served by the railway, and claimed inadequacy of return. The protestants contended the raise in rates is discriminatory and unreasonable. The Wheeling to Elm Grove line was the one on which the rate increases were desired.

**Interurbans Play Up Their Facilities.** — The Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., are calling the attention of merchants in the territory which they serve to fast freight service from Chicago to points in Indiana, Ohio and Michigan by interurban railway and Great Lakes boats. By arrangement with connecting lines first-day delivery is made to and from Indianapolis and first-day delivery to and from Chicago, through cars operating daily. Same day delivery to and from Michigan City, La Paporte, Rolling Prairie, New Carlisle, South Bend, Mishawaka, Elkhart, Goshen, Niles, Berrien Springs and St. Joseph is announced. The companies are operating express-freight service which means express service at freight rates.

**Six-Cent Fare Repealed.**—The newly-installed City Commission of Galveston, Tex., has repealed the 6-cent fare ordinance enacted by the former administration, under the terms of which the Galveston Electric Company was authorized to collect 6 cents for adult fares and 3 cents for children and students' fares. Before the 6-cent fare ordinance was repealed, the commission held a hearing at which representatives of the railway appeared and presented arguments tending to show that the higher fares were needed to pay the operating cost of the company, and that if the old fares were reinstated, the company would be forced into bankruptcy. Luke C. Bradley, Houston, district manager for Stone & Webster, in charge of all properties in Texas, presented an exhaustive financial report showing earnings and operating costs. A statement made by him previously to the Mayor was reviewed in the ELECTRIC RAILWAY JOURNAL of June 14, page 1192.

# Legal Notes

**FEDERAL COURTS**—*Under Laws of Ohio Franchise Is a Contract*

Under the laws of Ohio, the ordinances of Columbus granting street railway franchises for a fixed term of years, which were accepted by the grantees, constitute a binding contract, the obligation of which the company cannot avoid on the ground that the increased operating expenses, due to the war and the higher wages fixed by the War Labor Board, make it unprofitable, especially in the absence of a showing that further operation under the contract was impossible, or even that operation thereunder for the entire term of the franchise would be unremunerative. [Columbus Railway, Power & Light Co. *vs.* City of Columbus, Ohio, et al., 39 Supreme Court Rep., 349.]

**FEDERAL COURTS**—*Under California Law City Has Power to Build Competing Municipal Road*

Civ. Code Cal., Sec. 499, prohibiting two street railroads from using the same street for over five blocks, and a San Francisco city franchise containing similar provisions, held inapplicable to a municipal street railway system.

The establishment of a municipal street railway system, which was not prohibited by plaintiff street railway's franchise, did not constitute a taking of its property requiring a resort to eminent domain.

San Francisco City Charter, Art. 12, Sec. 2, requiring the municipality to consider offers to sell existing public utilities before constructing new ones, held sufficiently complied with where a general solicitation of offers for the sale of any existing street railway was sent to plaintiff street railway and others. [United Railroads of San Francisco *vs.* City and County of San Francisco et al., 39 Supreme Court Rep., 361.]

**INDIANA**—*Ejection of Passenger With Improperly Marked Ticket*

Where passenger who purchased a through ticket was required to change cars and boarded the proper train, she was entitled to passage thereon, though the conductor had given her a defective ticket. [Union Traction Company of Indiana *vs.* Smith, 123 Northeastern Rep., 4.]

**INDIANA**—*Failure of Wagon to Carry Tail Light Not Necessarily Negligence*

A wagon driver's failure to have a tail light on his wagon as required by city ordinance will not defeat recovery for personal injuries upon being struck by street car while driving along tracks, unless such negligence proximately contributed to the injury. [Indianapolis & Cincinnati Traction Company *vs.* Senour, 122 Northeastern Rep., 772.]

**GEORGIA**—*Power of State over Rates*

Under Const. Art. 4, Sec. 2, Par. 2 neither the Legislature nor any municipality can, by ordinance or contract, abridge the exercise of the State's police power. In the case in question, the city of Atlanta was without authority to pass an ordinance fixing the rates of fare upon the lines of the street railway constructed within the limits of the municipality, and any attempt by the municipality to pass such ordinances was nugatory. But where the State has not exercised, and is not seeking to exercise, its police power as to street railway fares, a municipality and a street railroad may enter into valid contracts on such subject. (Georgia Ry. & Power Co. *vs.* Railroad Commission of Georgia et al., 98 Southeast. Rep. 696.)

**MISSOURI**—*Obligation to Stop Car During Ejection*

Where a street railway's motorman knew a boy whom he was telling to leave the car was on the front steps, he should have stopped the car to give the boy opportunity to alight, and in failing to take such means to prevent injuries to him after knowing his peril, he was negligent, and the company was liable for injuries when the boy slipped under wheels. (Quirk *vs.* Metropolitan Street Railway, 210 Southwest. Rep. 103 and 106.)

**NEW YORK**—*Indemnity for Accident from Construction in Street Even with Negligence*

A surface street railway company had a right, as a condition of consent that the work of constructing an elevated railroad might be done over its tracks, to exact an agreement from the elevated railroad to protect it against any accident incident to the construction work, though contributed to or caused solely by the negligence of its own employees because the construction work presented additional dangers of accidents which the street railway was not required to assume. (Post & McCord, Inc., *vs.* New York Municipal Ry. Corp., 175 New York Sup. 392.)

**VIRGINIA**—*Powers of Municipal Corporations to Exempt from Taxes*

Municipalities of a State have no power to exempt property from taxation, except as they are expressly authorized by the State. (City of Richmond *vs.* Virginia Ry. & Power Co., 98 Southeast. Rep. 692.)

**WISCONSIN**—*Motorman Not Always Negligent When He Fails to Use Best Method to Avoid Accident*

A street car motorman, observing a pedestrian in danger, must use all reasonable care to avoid striking him, but if a sudden emergency arises without his negligence, and there are different ways to avoid collision, he is not negligent because he fails to select the best course. [Williams *vs.* Duluth Street Railway, 171 Northwestern Rep., 939.]

# New Publications

### The Turnover of Factory Labor

By Sumner H. Slichter. D. Appleton & Company, New York, N. Y. 460 pages. Cloth, $3 net.

The basic idea back of this book is that a definite plan and specific responsibility for creating and executing the plan are as necessary in dealing with labor as in controlling manufacturing operations. Not only does the book study the labor-turnover problem, but it also analyzes methods of handling men in order to guide employers to the adoption of proper means to reduce the turnover with its hugh expense. The work is timely, informative and constructive.

### Efficient Railway Operation

By Henry S. Haines, formerly vice-president and general manager "Plant System" and ex-president American Railway Association. 709 pages, the Macmillan Company, New York, N. Y., $4.

In this book on railway operation in general, the electrification of steam railroads is covered both historically and in connection with the railroad of to-day. It will be of value to electrification enthusiasts in showing the conservative point of view of an experienced steam railway operator. On page 32 Mr. Haines says:

> It is finally to be recognized that after more than ten years of experimental practice on an extensive scale by a number of important corporations, electric traction has superseded steam on less than 700 miles out of the 250,000 miles in the railway system of the United States. Taking all these matters into consideration, there need be no apprehension of steam being replaced by electric traction to such an extent as to affect the existing capitalization of our steam railroad system.

It is interesting to note that he avoids the term "electric locomotive," using in its place "electric tractor."

### Opportunity Monographs

Prepared by the Federal Board for Vocational Education, Washington, D. C.

These pamphlets are prepared by the Bureau mentioned to aid disabled soldiers, sailors and marines in choosing a vocation. Two have recently appeared of interest to the electric railway field. The first is No. 30 and covers opportunities for work on steam railroads and street railways. The suggestion is made that certain physical defects do not disbar a person from the position of motorman or conductor, although both occupations are mentioned as requiring a high degree of responsibility. Other branches of electric railway service in which disabled men, if skilled, could work to good advantage are as machinists, electrical workers, armature winders, carpenters, car repairers, linemen, track foremen and inspectors. The duties in these occupations are given in the pamphlet. The second pamphlet describes the occupations in the electrical manufacturing industry.

# Personal Mention

**Percy L. Radcliffe** has been named night superintendent of the city lines of the Detroit (Mich.) United Railways.

**D. A. Smith** has been appointed to succeed Leo Reynolds as superintendent of the Michigan, Gratiot, Mack, Brush, Davison, North Detroit and Leesville lines of the Detroit (Mich.) United Railways.

**J. P. S. Lyles** has been appointed counsel for the Columbia Railway, Gas & Electric Company, Columbia, S. C., to succeed William Elliott, whose resignation is announced elsewhere in this department.

**Leo Reynolds** has been appointed division superintendent of the Woodward, Hamilton, Victor and Northwestern belt lines of the Detroit (Mich.) United to succeed James Bullen, who has resigned after many years of service with the company.

**Leon Snyder,** who has been acting as night superintendent of the city lines of the Detroit (Mich.) United Railways, has resumed his duties as assistant division superintendent of the Woodward, Hamilton, Victor and Northwestern belt lines of the company.

**P. C. Reinhardt** has been promoted to the position of treasurer of the International Railway, Buffalo, N. Y., to succeed the late George W. Wilson. Mr. Reinhardt has been with the company for twenty-eight years, starting as a receiving clerk. He was later assistant paymaster, assistant cashier, cashier and assistant treasurer.

**William Elliott** has resigned as counsel for the Columbia Railway, Gas & Electric Company, Columbia, S. C. Mr. Elliott was general manager of the company from 1906 to 1910, when he became general counsel, in which capacity he has since continued. He remains as a member of the board of directors of the company and will continue as counsel for the company in the so-called canal litigation.

**John Paul Lucas** has been appointed director of publicity for Southern Public Utilities Company to succeed Leake Carraway, who resigned a month ago to become connected with the Virginia Railway & Power Company, with headquarters at Norfolk, Va. Mr. Lucas entered the service of the Charlotte *Observer* in 1901 as a reporter. In 1905 he went to Trinity College to take a special course, returning to the *Observer* at Charlotte as assistant city editor and has since been engaged continuously in newspaper work. When the federal government established the food administration with Henry A. Page as State administrator in North Carolina he called Mr. Lucas to become executive secretary, and in this position he directed the activities of a number of the divisions of the commission, including that of publicity, and while he did not carry that title he was to all intents and purposes the assistant State food administrator.

**James E. Gibson,** general manager of the Kansas City (Mo.) Railway since 1916, has resigned from the company. It is understood that Mr. Gibson has under consideration plans to enter the banking business, but that he may decide to continue in electric railway work. Mr. Gibson was born in Kansas City on Aug. 28, 1881. He is the son of James F. Gibson, formerly judge of the Circuit Court. He was educated in the public schools of Kansas City and at the University of Missouri, from which institution he was graduated with the class of 1902. In the same year he was appointed secretary to Congressman W. H. Cowherd. After serving under Mr. Cowherd from 1902 to 1904 he resigned to enter the service of the Metropolitan Street Railway, Kansas City, the predecessor of the Kansas City Railways, as a clerk in the accounting department under J. A. Harder, then auditor of the company. In December, 1905, he was advanced from the auditing office to the position of assistant to President Corrigan of the company. He entered the transportation department of the company in 1909 as superintendent of the forty-eighth and Harrison division, where he remained until June, 1910, when he was appointed to the office of general superintendent of the company. He served in the capacity of general superintendent through the receivership of the Metropolitan Street Railway and the reorganization of the company as the Kansas City Railways.

J. E. GIBSON

**J. McMillan,** general manager of the Pacific Electric Railway, Los Angeles, Cal., retires from active service on July 1. Mr. McMillan has rounded out nearly forty-five years of railway service with the Southern Pacific lines and the Pacific Electric Railway, having during the last sixteen years faithfully served the Pacific Electric Railway in an official capacity. Though no longer in active service, Mr. McMillan will in a sense remain with the company for the vacant position will not be filled. Mr. McMillan began his railroad career with the Houston & Texas Central Railway in the capacity of telegraph messenger. He soon became an operator and later was made station agent. In 1878 he entered the employ of the Galveston, Harrisburg & San Antonio Railway. Subsequently Mr. McMillan went to San Antonio as freight agent and later he was made commercial agent and district freight and passenger agent and finally division passenger agent. Early in 1903 Epes Randolph, vice-president and general manager of the electric railways which H. E. Huntington planned for Los Angeles and southern California, selected Mr. McMillan as chief clerk. When Mr. Randolph retired, Mr. McMillan was appointed traffic manager and since the retirement of General Manager Schindler, who succeeded Mr. Randolph, Mr. McMillan has handled both the traffic and transportation interests of the Pacific Electric Railway and Los Angeles Interurban Railway. "Joe" McMillan, as he is generally known in Los Angeles and the territory served by the lines with which he was connected, is admired for his sterling qualities and good fellowship, for his mastery of his profession and for his loyalty to his friends and to the interests intrusted to him.

# Obituary

**W. R. Kerschner** of W. R. Kerschner & Company, Inc., New York City, died of plural pneumonia on June 21 at the age of forty-seven years. Before coming to New York City in 1910 Mr. Kerschner was in the electric railway supply business in Allentown, Pa. In 1915 he organized W. R. Kerschner & Company, Inc., and arranged to handle the products of the Keyes Products Company, Cincinnati Car Company, Albany Car Wheel Company, Charles I. Earll and the Columbia Machine Works & Malleable Iron Company. Mr. Kerschner was vice-president of the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., with which he had been closely associated for twenty-two years. Mr. Kerschner's presence at conventions and at other electric railway gatherings will be missed. He was well known in the industry and popular because of his loyalty to his friends, readiness to do his share in anything which came up and unfailing good humor.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Steel Market Steady Under Increasing Buying

### Stability Reflected in Little Price-Cutting Being Done, with Upward Tendency Apparent

The iron and steel market is showing a much better tone than it did a month ago. Orders have been coming through in much better volume for structural steel, and the steam railroads have considerable proposition work and also have begun to make better purchases. The electric roads have confined most of their activity to proposition work, of which much is in the hands of track material manufacturers. This is particularly true of frogs, crossings, etc., inquiries on which are naturally expected to turn into orders eventually. How long that eventuality can be put off it is difficult to say.

The whole condition of the steel market shows much more stability than at other times this year. The railway orders, while not for large quantities of rails, special work, bolts, nuts, spikes, plates, etc., have increased in an encouraging manner. Prices have as a whole remained steady since the change of the latter part of April. Some cases have been found where price cutting has been practiced, but this in general seems to be because certain smaller dealers want to realize on some material bought under large contracts or because a mill has been running slow and the producer is willing to cut prices in order to get business and keep his force together. But that time is about passed now, and most price cutting seems to be on resales.

#### SMALL QUANTITIES OF RAIL BEING BOUGHT

Stocks of track specialties laid in by the steam railroads in the last two years have not been entirely exhausted and where they can be used on other lines they are transferred as needed. But it will not be long before these are used up and new ones must be purchased. Several railroads came into the market a few weeks ago with inquiries for spikes, but later reported that they had been able to secure some from other roads and would not buy for the present. The general inquiry for spikes is very light. Electric roads have been purchasing small quantities of high T and girder rails and special work, but rather for repairs and replacements than for new work. It is expected that little new work will be started this year.

The special track work which the electric roads have been buying has been less and less in the line of solid manganese pieces and tends more toward manganese inserts at the places of wear. Some roads have found they could get along well with only the inserts and may not go back to the more expensive solid specialties. The price for manganese is fluctuating considerably, so no set price holds on special work. Besides, almost every piece of work is different, due to curves, angles, etc., so that again no set price is laid down. Taken all in all, steel prices are at present steady and little immediate change is anticipated, although indications are that the tendency will be upward rather than downward.

## Transformer Stocks Now Practically Normal

### Producers Stand Ready to Build Machines for Continuous Pressures Up to 225,000 Volts

During the period of low sales volume which followed the midwinter relaxation of war material production, manufacturers of transformers utilized the opportunity to build up stocks, and these are now practically normal. Prompt deliveries can be made on distribution transformers of standard design. On power transformers deliveries are now about as good as can be expected in view of the painstaking care necessary in building high-class units.

Generally speaking, the higher-voltage equipments require increased time in the factory for the proper handling of the insulation problem, and from two to three months is still requisite for the shipment of transformers of this class or of the larger sizes designed to meet special conditions and not ordinarily carried in factory stocks. Rush orders are now and then put through in shorter periods, but the design and construction of transformers which will withstand severe over-potentials due to surges and other causes is a problem requiring such technical skill that the time allowances above outlined represent conservative practice and should not be curtailed except for extreme needs.

While development work is not specially active at this time, it is noteworthy that transformer builders stand ready to produce equipment capable of continuous operation at pressures up to 225,000 volts. Line difficulties appear to be the limiting factor in present transmission engineering, decided advances having been accomplished within the last three or four years in dissipating the effects of excessive voltage peaks and interwinding strains in transformer equipment itself.

## Power Tools Selling Fairly Well

### A Number of New Electric and Pneumatic Devices Are Coming in the Market

The amount of shop work being done in repairing electric railway equipment and rebuilding cars has caused somewhat better sales in this field of electric and pneumatic tools. Lack of new line building has of course kept down heavy sales.

Track drills have sold fairly well, considering the amount of work that is being done in rebuilding of roadbed. Sales are expected to increase considerably when the roads begin to extend or relay their rails.

Several new types of both pneumatic and electric tools have recently made their appearance in the market, and manufacturers have sufficient capacity and supplies to take care of the business they feel will come their way when the building on a large scale really gets under way.

Prices have been steady but the tendency, manufacturers say, is upward, if anything.

## Journal Box Packing

### More Attention Being Paid to This Material as Necessity for Substitutes for Wool Waste Arises

Journal box packing has in the last few years been getting more and more attention, and particularly now that there is a scarcity of wool the need for substitutes arises.

In the past wool waste was the factor which gave the packing the necessary resiliency. Although offering less capillarity to the oil than did cotton, wool was used sometimes entirely for the packing and sometimes mixed with varying amounts of cotton—the wool providing the resiliency and the cotton the oil carrier. The scarcity of wool waste during the war and at present, and its high price, required the use of a substitute which would provide resiliency and keep down packing costs.

Several waste mixtures are on the market. Among the substitutions used for wool are animal and vegetable fibers, sponges, steel and brass springs and steel turnings. The use of these has cut the wool content from 25 to 100 per cent, for in one packing no wool was used. These foreign materials must be correctly and uniformly mixed with the wool and cotton, of course, in order to give the right packing required for the duty to be done. Besides saving wool these mixtures, it is claimed, save oil, as greater resiliency and greater oil capacity are said to result per pound of packing. Also some roads have found much less labor necessary for repacking and reoiling with the compounded wastes.

Some wool wastes are costing from 30 to 40 cents a pound; cotton waste is about 13 cents, with a tendency upward. This is because of the large quantities of cotton waste being bought by England for respinning, as it costs them less than raw cotton does. The source of wool waste is diminishing. The best grade, it is stated, is found from old carpets, and the demand for floor coverings to-day is for rugs rather than carpets. Rug waste is of little value as wool waste. The cost of the compounded wastes is nearer 15 and 20 cents a pound.

There is sufficient supply of these substitutes so that orders can be shipped in quick time. There is already more interest being shown in the packing by electric roads although it is the larger roads which have been more active.

## Insulating Materials Selling Better

### Prices Steady Just at Present, but There Are Indications of Higher Prices to Come

Manufacturers of insulating compounds and materials state that sales are coming through in better shape than they were a month or so ago. This better buying movement is traced to the amount of repair and rewinding work that is being done. Regardless of the amount of work done in keeping in touch with prospective customers, one producer finds solicited business picking up in a satisfactory manner.

Inquiries also are more active, with requests for samples and prices. Prices are at present steady, but with cotton advancing and a heavy export demand anticipated after peace is settled, it would not be surprising if prices on tapes and cloths advanced further. At the same time there is no reason to believe that prices on insulating varnishes and other compounds are due for a drop.

## Rolling Stock

**Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.**, is trying to get two trailers for early delivery. A new interurban car is expected on early July delivery.

**The Connecticut Company** has received four new city and interurban cars for operation on the New Haven (Conn.) lines. The others of the eleven ordered are due to arrive soon from the Brill factory and will be placed in service on other runs.

**Eastern Massachusetts Street Railway**, formerly the Bay State Street Railway, Boston, Mass., announced recently that it had voted to spend $125,000 immediately to rebuild thoroughly 100 cars, which will soon be in operation. The work has already been started at the Lowell car shops.

## Track and Roadway

**Galesburg Railway, Lighting & Power Company, Galesburg, Ill.**—The lines of the Galesburg Railway, Lighting & Power Company throughout the city of Galesburg will be improved and an extension will be built of the West Main Street line to Linwood Cemetery, where a loop will be constructed.

**United Railways & Electric Company, Baltimore, Md.**—A contract has been awarded by the United Railways & Electric Company to the Price Construction Company, Baltimore, for building a reinforced concrete two-story signal tower at Sparrows Point.

**Butte (Mont.) Electric Railway.**—The Butte Electric Railway will begin at once paving the tracks on West Granite Street, from Montana to Henry. This is in preparation for work of bitulithing the street. The present 4-in. rails will be replaced by 5⅝-in. rails, and new ties will be laid. The cost will be about $25,000.

**Interborough Rapid Transit Company, New York, N. Y.**—Announcement has been made that the extension of the dual system between Atlantic Avenue and Utica Avenue on the Eastern Parkway subway will be ready for operation about Feb. 1.

**Ohio Traction Company, Cincinnati, Ohio.**—The County Commissioners of Hamilton County voted a bond issue of $500,000 to defray the expenses of lowering the tracks of the Ohio Traction Company within the village of Wyoming to conform to the new grade of the Carthage-Hamilton pike. The County Commissioners will do the work and will charge the expense to the Ohio Traction Company.

**Cleveland (Ohio) Railway.** — Improvements planned by the Cleveland Railway include the construction of three new lines and two extensions of existing lines at a cost of about $640,000. The three new lines to be constructed are the East Thirtieth Street line from St. Clair Avenue to Broadway, about 2 miles; the West Seventy-third Street line from Denison Avenue to the West Park cemetery, about 8000 ft., and the Broadview line, from West Twenty-fifth Street to Schaaf Road, about 5300 ft. Extensions will be built of the Kinsman Road line from East 140th Street to East 156th Street, 3300 ft. and the Union Avenue line from East 112th to East 131st Streets, 7500 ft.

**Portland Railway, Light & Power Company, Portland, Ore.**—An application has been filed by the Portland Railway, Light & Power Company for the storage of 40,400 acre-feet of water from the Oak Grove Creek for development of power along the Clackamas River. The construction of a storage reservoir is estimated to cost $300,000.

**Hull (Que.) Electric Company.**—The Hull Electric Company is reconstructing 1.5 miles of track, using 85-lb. rails in place of 56-lb. rails.

**Quebec Railway, Light & Power Company, Quebec, Que.**—A 1-mile extension will be built by the Quebec Railway, Light & Power Company on the Beauport Road in Limoilou Ward, between the Canadian Railway tracks at Mastai Village to the city limits.

**Houston, Richmond & Western Traction Company, Houston, Tex.**—Plans are being made by the Houston, Richmond & Western Traction Company to begin work at once on the construction of its proposed interurban line from Houston to San Antonio. A proposition has been submitted to the citizens of Eagle Lake to bring the line through that city and a committee of five was appointed to secure the right-of-way for the line through Colorado County. Ed. Kennedy, general manager. [Oct. 6, '18.]

## Power Houses, Shops and Buildings

**Boston (Mass.) Elevated Railway.**—Plans are being prepared by the Boston Elevated Railway for the installation of two new multi-stage, turbine centrifugal pumping units, each of 3000 gal. per minute capacity in the power station at Lincoln Street.

**Interborough Rapid Transit Company, New York, N. Y.**—Transit Construction Commissioner John H. Delaney has instructed the engineering staff under his direction to prepare plans for and estimate the cost of the construction of a new station on the Interborough subway at 122nd Street and Broadway, application for which has been made in the form of numerous petitions recently filed with him by the Harlem Board of Commerce and by individuals on Morningside Heights.

**Pittsburgh (Pa.) Railways.**—The receivers of the Pittsburgh Railways Company have petitioned the federal court, under which they operate the lines, for permission to spend enough money to put the South Eleventh and South Twelfth Street inclines into condition for reopening. They were closed several months ago, so that electric motors might be installed to replace the old steam motive equipment.

**Philadelphia & Western Railway, Upper Darby, Pa.**—The Philadelphia & Western Railway is offering for sale a fully equipped power plant, at present in operation, of 4000-kw. rated capacity, generated through two Curtis vertical turbo-generators of 2000-kw. capacity each. The plant is supplied with superheaters, boilers, transformers, rotary converters, with auxiliary apparatus, and is situated within a few miles of Philadelphia.

**Hull (Que.) Electric Company.**—It is reported that the Hull Electric Company will purchase two 60-kva. oil-cooled, single-phase transformers, 10,000 volts to 2300 volts.

**Dallas (Tex.) Railway.**—A contract has been awarded to the Fred A. Jones Construction Company for the construction of a six-story addition to the present Interurban Building at a cost of about $125,000.

**North Coast Power Company, Vancouver, Wash.**—The North Coast Power Company will reconstruct its transmission line from Kelso to Kalama. The line now carries a load of 6600 volts and will be built for a load of 22,000 volts. The improvement will cost about $30,000.

**Pacific Northwest Traction Company, Seattle, Wash.**—A new station has been completed by the Pacific Northwest Traction Company at Sixth Avenue, between Pine and Olive Streets, for the use of the Everett interurban line.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—The city of Seattle is negotiating with the Puget Sound Traction, Light & Power Company for the purchase by the city of the traction company's surplus electric power.

## Trade Notes

**Arthur Power Recording Company, New Haven, Conn.**, announces an order received recently for 400 power-saving recorders, and several smaller orders.

**Detroit Insulated Wire Company** announces that R. S. Wakefield has recently been appointed representative for Texas with offices at 13,123 Great Southern Life Building, Dallas.

**B. A. Wesche Electric Company, Cincinnati, Ohio**, manufacturer of electrical apparatus, announces change in address of its Eastern sales agent to 110 West Fortieth Street, New York City.

**Railway Audit & Inspection Company, Inc., Philadelphia**, writes that the correct title of Charles H. Dennis, mentioned in a recent issue as formerly operating head of the company, was general superintendent of employment.

**H. L. Garbutt**, for the last six years manager of the line material section of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed manager of the supply division of the Westinghouse San Francisco office.

**Bound Brook (N. J.) Oil-Less Bearing Company**, announces a new machine shop and office building of concrete and steel construction, 100 ft. x 180 ft., two-story, being built for its use on Lincoln Boulevard, adjoining the present foundry and the Nigrum Impregnated Wood Works. By this move the company will have its entire factory located at one point.

**William B. Schaife & Sons Company, Pittsburgh, Pa.**, announces the opening on July 1 of a Chicago sales and engineering office at 38 South Dearborn Street, with Charles F. O'Hagan, formerly chief engineer of the company at Pittsburgh, as resident engineer and manager. This company was founded in 1802 and makes, among other equipment, the We-Fu-Go and Scaife water softeners and filtering equipment.

**British Westinghouse Electric & Manufacturing Company, Ltd., Manchester, England**, through its committee on the Westinghouse War Relief Fund, raised, up to the end of December, 1918, nearly £66,000. Of this amount, approximately two-thirds had been subscribed by the employees and one third by the company. The company reports that the present balance is sufficient to cover for a period of at least ten years the relief of the disabled and the dependents of those who have made the supreme sacrifice. There are 207 relatives and 382 children of deceased workers, in addition to many disabled soldiers and sailors for whom responsibility has been incurred.

**National Conduit & Cable Company**, according to the *Wall Street Journal*, showed a deficit of $219,694 in the first quarter this year, compared with a deficit of $292,413 in the corresponding quarter of 1918. The stagnant condition which prevailed throughout the brass industry over the first three months of this year, it was stated, resulted in few companies earning sufficient to cover overhead, depreciation, etc. Companies which manufacture brass and copper products are not working at more than 50 per cent of capacity. Some of them are only handling one-third the business transacted in normal times. However, it is expected that June will witness a good buying movement.

**R. H. Beaumont Company**, 315 Arch Street, Philadelphia, manufacturer of conveying and hoisting systems, is expanding its business to take in complete boiler houses under one contract covering the entire job. R. H. Frost, formerly with John W. Cowper, Buffalo, N. Y., has been engaged to take charge of all matters pertaining to this branch of the business. He will co-operate with the company's engineering department in the design of a standard boiler-house structure. The company has opened an office in Cleveland, Ohio, with H. B. Mosley, formerly with the home office, as manager. The Canadian Fairbanks-Morse Company, of Montreal, is representing the Beaumont company in Canada.

**Mitchell-Rand Manufacturing Company**, after extensive alterations to the building at 18 Vesey Street, New York City, has brought together its general offices, laboratory and warehouses under the one roof at this address. Founded over thirty years ago, the firm until quite recently dealt exclusively in waxes, asphaltum and compounds manufactured therefrom—sealing waxes, waterproofing and roofing cements, etc.; later electrical insulating compounds were produced, and to these were added insulating paints, varnishes, soldering paste, varnished tubing, manufactured mica, varnished materials and papers. As Eastern representatives of the Hope Webbing Company the Mitchell-Rand Company carries an extensive stock of tapes.

**General Electric War Service Record**—The enviable war record of General Electric employees at the Schenectady plant was summarized on a large display board located at the head of Works Avenue, Schenectady, to stimulate interest in the Victory loan. In effect, this display board is a large and handsome poster showing the complete war work of the Schenectady employees in the Liberty loan drives, the various fund campaigns and a record of local General Electric men in the army and navy service. Surmounted by the American eagle and the motto "The U. S. A. Our Country," this board shows the number of bonds sold in all the loan drives, including the record for the Victory loan. It gives the amounts raised for other campaigns, including war savings stamps. The total loans amount to $8,791,250 and the total war gifts to $339,313. The works' honor roll contains 3278 names, and there are thirty-five gold stars on the works' service flag. This bulletin board is in colors, with the emblems of various war relief organizations on either side, and is really a wonderful piece of work.

## New Advertising Literature

**Strauss & Buegeleisen, New York City**: "Handbook of Eye Protection for the Industries."

**Mitchell-Rand Manufacturing Company, New York City**: Form No. 227, a folder on paints and varnishes for electrical insulation.

**John C. Dolph Company, Newark, N. J.**: A chart showing specific gravities of its insulating varnishes and also a solvent chart.

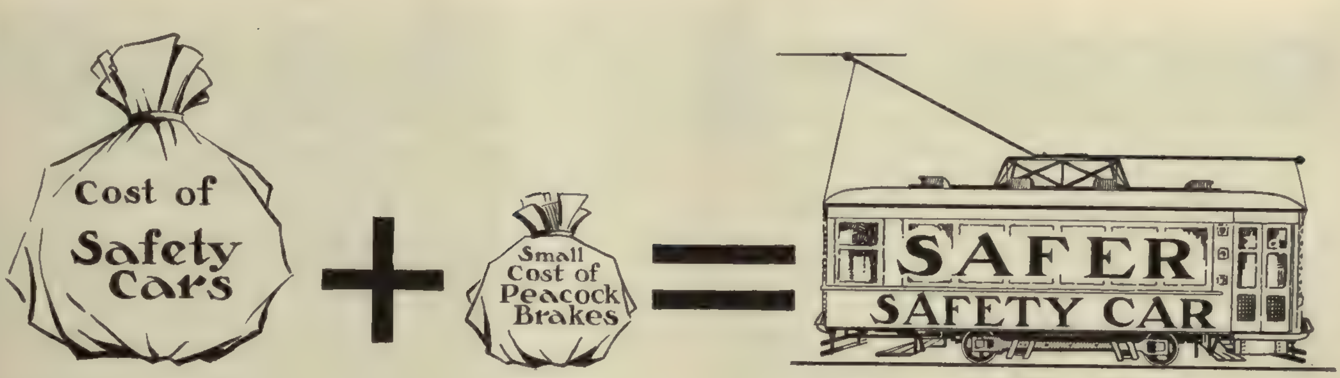
**Allis-Chalmers Manufacturing Company, Milwaukee, Wis.**: Bulletin No. 1096-A on "Direct Current Motors and Generators."

**Joyce-Cridland Company, Dayton, Ohio**: Catalog "G" on "Lifting Jacks." This is a general catalog and its price lists supersede previous lists.

**Westinghouse, Church, Kerr & Company, New York City**: Folder entitled "Every Phase Work" containing pictures of construction work of great variety.

**Humphryes Manufacturing Company, Mansfield, Ohio**: Bulletin on drainage pumps, bulletin No. 250 on "Hand and Power Pumps" and No. 251 on "Horizontal Double Acting Force Pump."

**Locomotive Superheater Company, 30 Church Street, New York City, and People's Gas Building, Chicago**: An eight-page bulletin, T-2, which sets forth the advantages of the Elesco stationary superheater.



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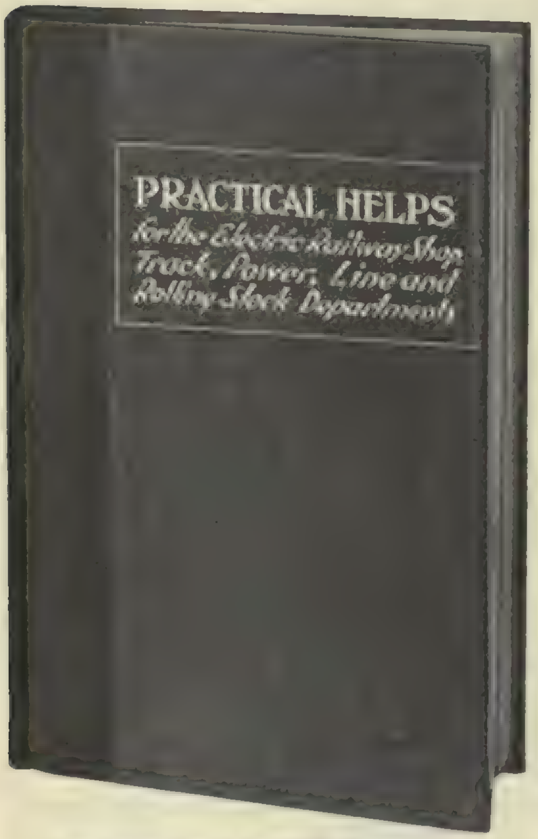

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**Section III—(7 Chapters)—Out on the Transmission Line, by Charles R. Harte, Construction Engineer, The Connecticut Company.**

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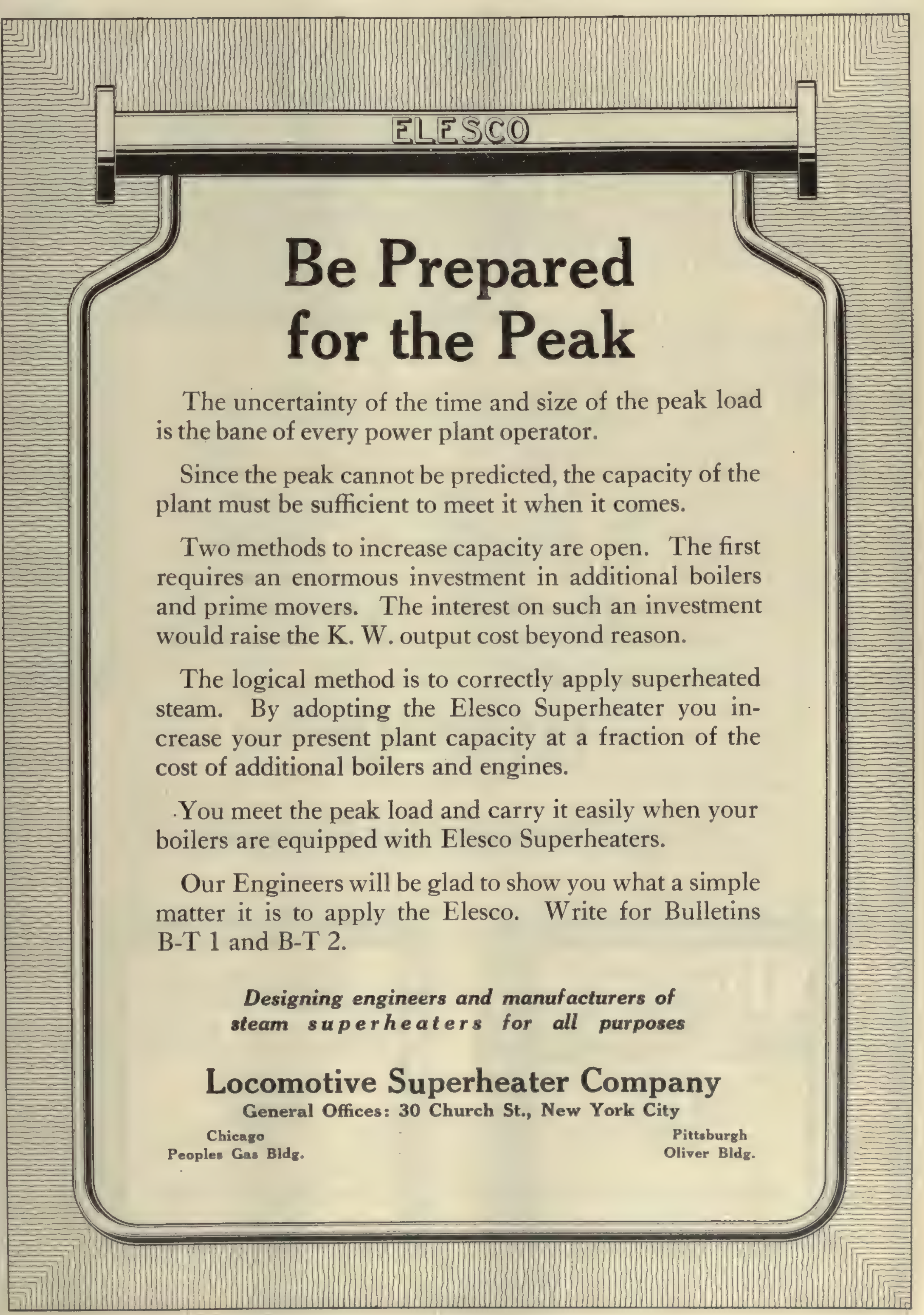

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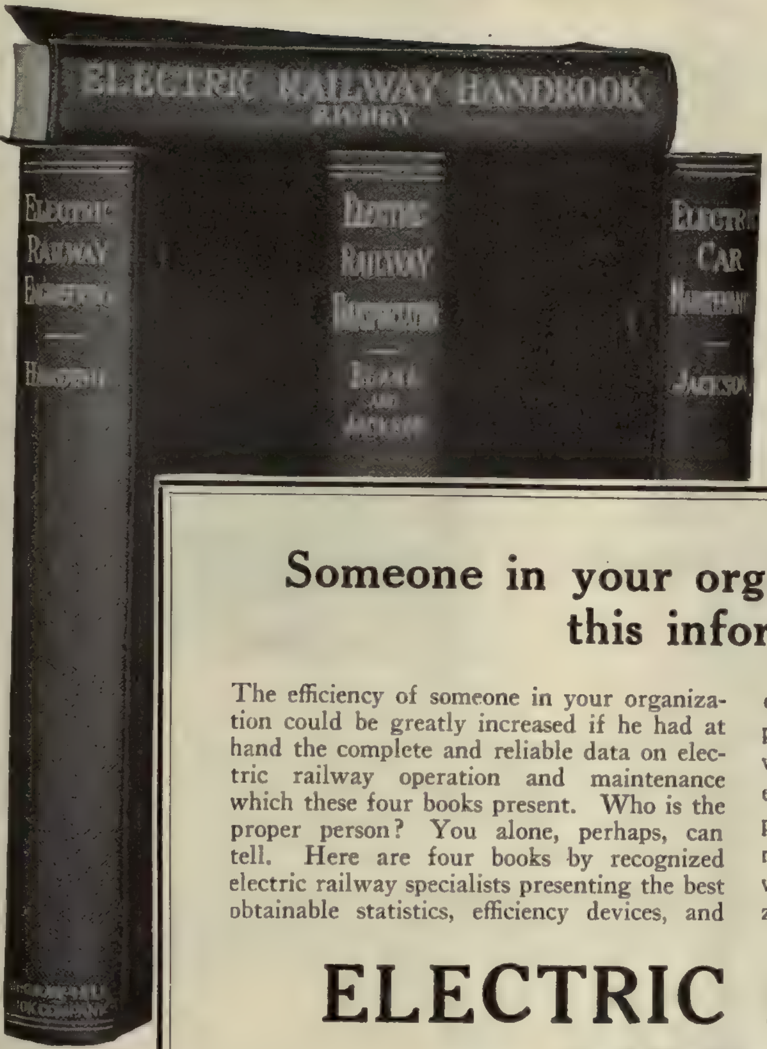
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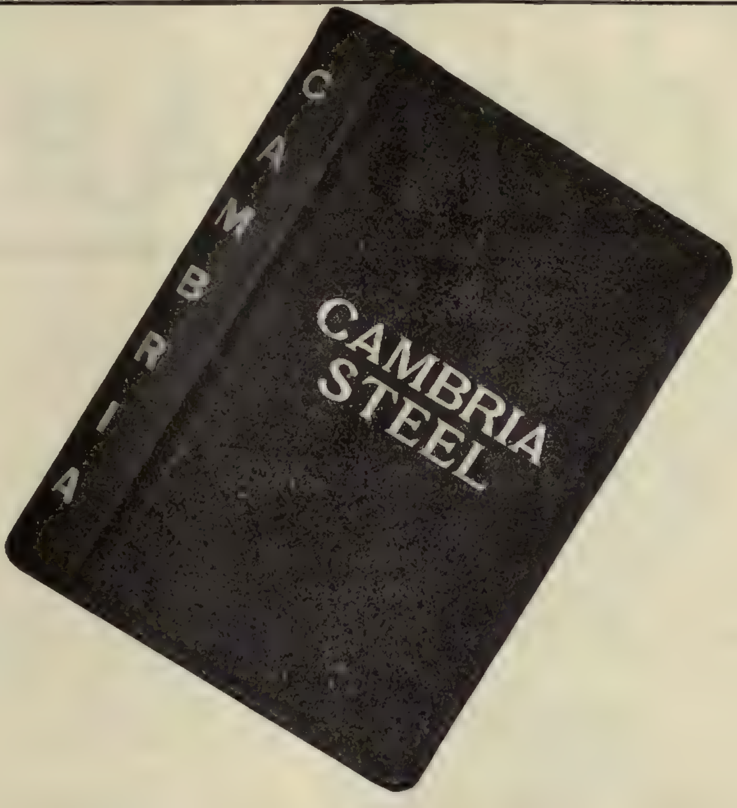

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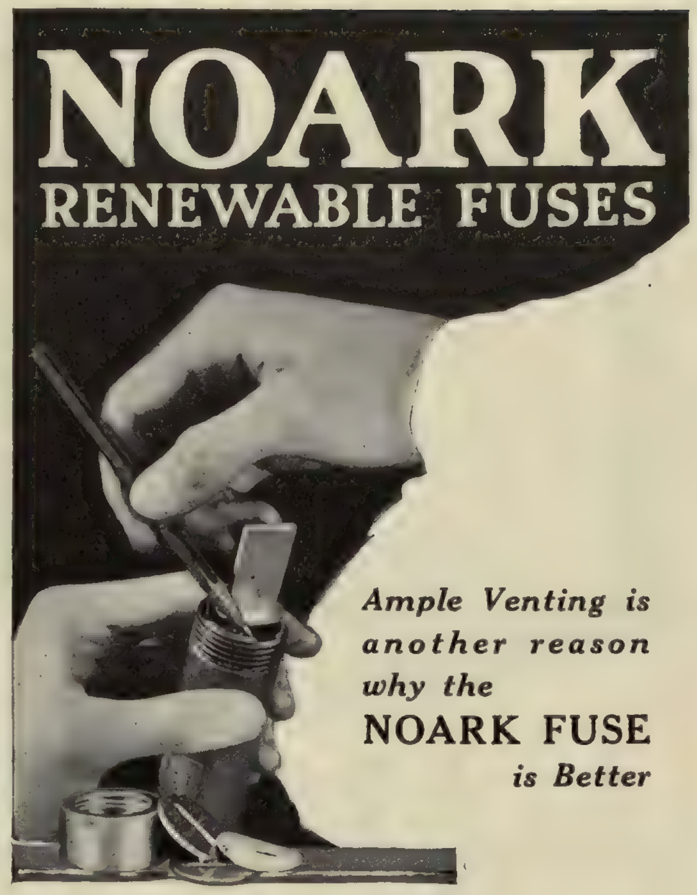

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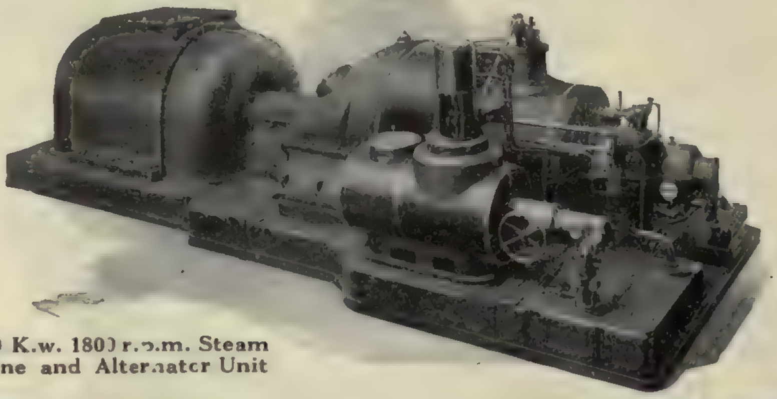

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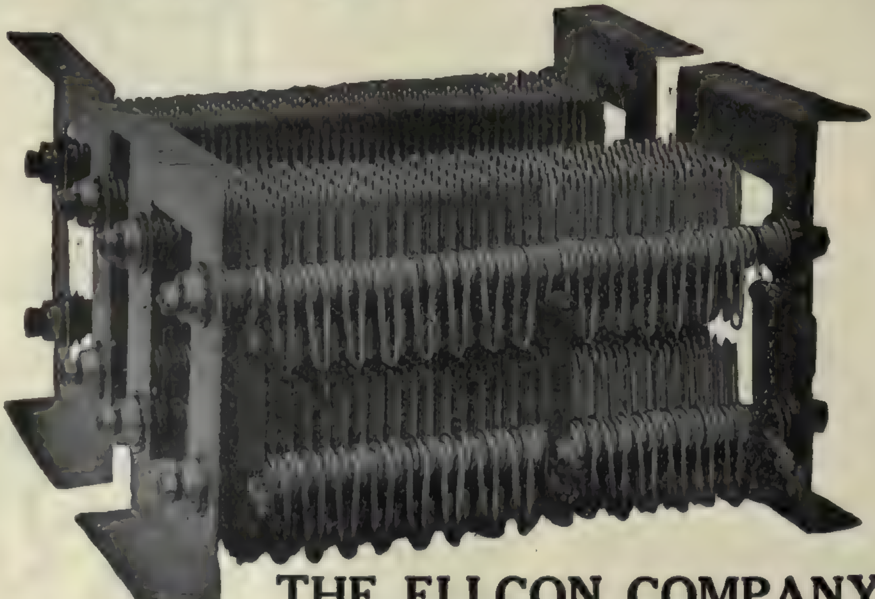

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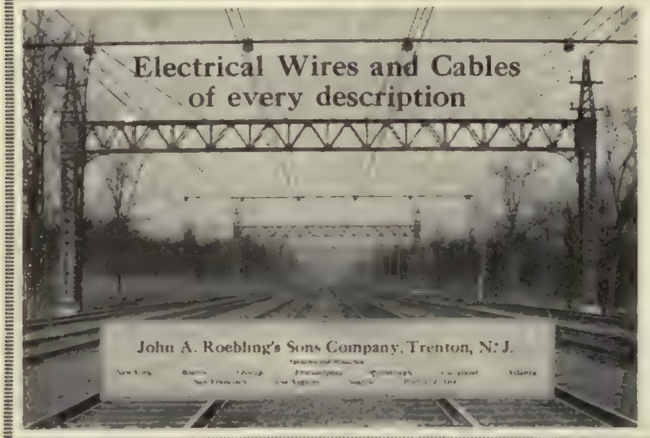
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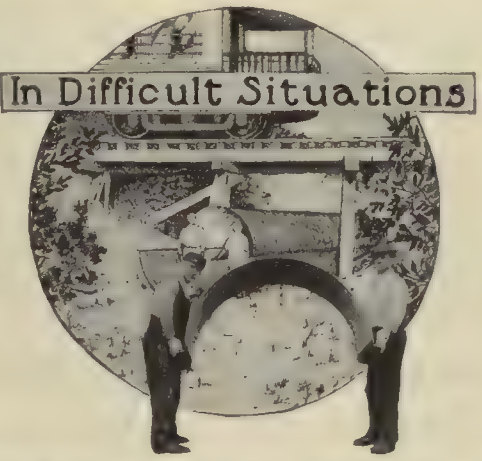

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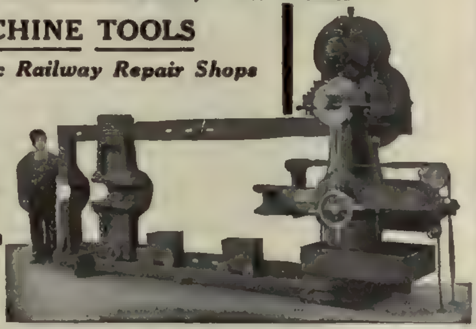

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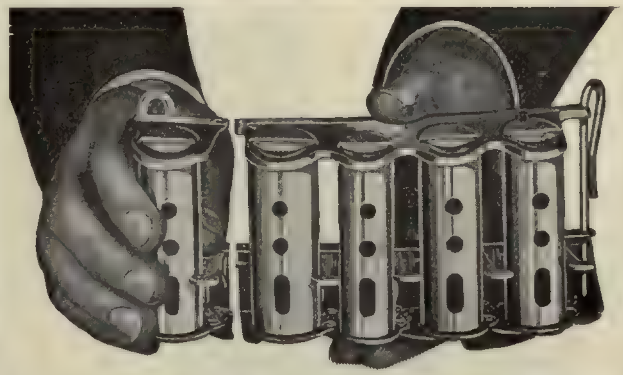

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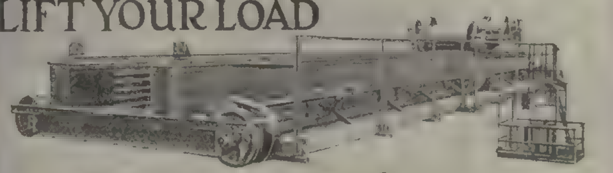

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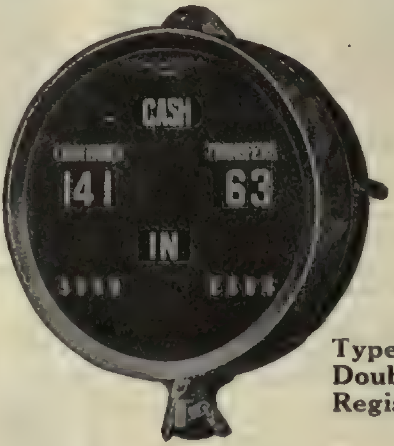

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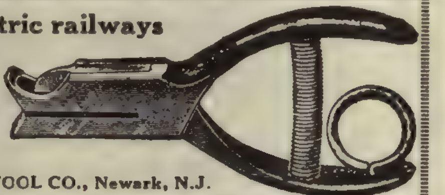

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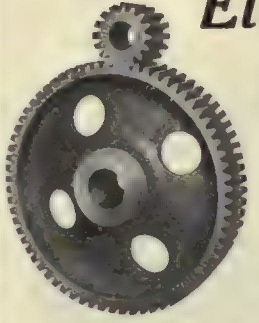

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Practically every worth-while contractor can be reached through this **One Dominant Paper.**

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**"Boyerized" Products Reduce Maintenance**

| | |
|---|---|
| Bemis Trucks | Manganese Brake Heads |
| Case Hardened Brake Pins | Manganese Transom Plates |
| Case Hardened Bushings | Manganese Body Bushings |
| Case Hardened Nuts and Bolts | Bronze Axle Bearings |

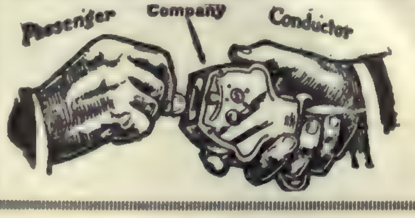
**Bemis Pins** are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**

VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.
**2325 So. Paulina St., Chicago, Ill.**



**Direct Automatic Registration**
By the
**Passenger**

**Rooke Automatic Register Co.**
**Providence, R. I.**

**RAILWAY UTILITY COMPANY**

*Sole Manufacturers*
**"HONEYCOMB" AND "ROUND JET" VENTILATORS**
for Monitor and Arch Roof Cars, and all classes of buildings; also **ELECTRIC THERMOMETER CONTROL** of Car Temperatures.

**141-151 WEST 22D ST.**
**Chicago, Ill.**

*Write for Catalogue*

**1328 BROADWAY**
**New York, N. Y.**

# *Get Your Wants into the Searchlight*

## ADVERTISING RATES

### Ads Set in Uniform Style

*(Solid, in one paragraph, without display.)*

**THREE CENTS A WORD**, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted
Evening Work Wanted
Vacation Work Wanted
Salesman Wants Connections

**FIVE CENTS A WORD**, minimum charge $1.50 an insertion, for advertisement under:

Agencies Wanted
Agents Wanted
Business Opportunities
Desk Room for Rent
Educational
Employment Agencies
Desk Room Wanted
Foreign Business
Positions Vacant
Partner Wanted
Representations Wanted
Salesmen Wanted
Patents for Sale
Plants for Sale
Sub-Contracts Wanted
Work Wanted
Miscellaneous for Sale, for Rent or Want Ads.

**THIRTY CENTS A LINE**, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

**THREE DOLLARS AND SIXTY CENTS AN INCH** for advertisements for bids (Official Proposals).

### Ads Set in Display Type

*(Individual space, within border rules.)*

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

**Schedule of Rates**

| | | | |
|---|---|---|---|
| 1 to 3 in., | $3.00 an in. | 15 to 26 in., | $2.70 an in. |
| 4 to 7 in., | 2.90 an in. | 27 to 49 in., | 2.60 an in. |
| 8 to 14 in., | 2.80 an in. | 50 to 99 in., | 2.50 an in. |

Rates for larger space furnished on request.

> *For quick and satisfactory results tell the reader everything that he will want to know.*

## INFORMATION

**ALLOW FIVE WORDS** for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

**IN REPLYING TO ADS**, do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

**BE CAREFUL TO PUT ON ENVELOPE**, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

| | |
|---|---|
| 36th St., at 10th Ave., | New York |
| 935 Real Estate Trust Bldg., | Philadelphia |
| 657 Leader-News Bldg., | Cleveland |
| 1570 Old Colony Bldg., | Chicago |
| 501 Rialto Bldg., | San Francisco |

**WHEN ADVERTISING MACHINERY**, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

**TO SIGN YOUR NAME** and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

POSITIONS VACANT

# EMPLOYMENT

POSITIONS WANTED

## POSITIONS VACANT

ASSISTANT engineer wanted by city and suburban road. Experienced on track maintenance, bonding and bridge work. State age, experience and salary expected in first letter, also references. P. O. Box No. 576, Norfolk, Va.

ELECTRIC Railway Light and Power Company in city of 25,000 population requires a practical manager; electrical experience essential. Address stating salary expected, experience and references in detail. P-436, Elec. Ry. Journal.

FOREMAN wanted for city car house. 150 cars. Middle West. First-class pay. Eastern man preferred. Address P-431, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

## POSITIONS WANTED

ENGINEER maintainance of way and structures desires change; expert on special track work; Eastern location preferred. PW-434, Elec. Ry. Journal.

GENERAL shop foreman by high-grade man with 15 years' experience in modern shop methods. PW-437, Elec. Ry. Journal, Chicago.

POSITION as superintendent or trainmaster with electric firm; 50 years old; married; with present company 16 years. Ten years as trainmaster and claim agent; can furnish best references; will be open for position after July 10th; South or Southwest preferred. PW-438, Elec. Ry. Journal, Chicago.

## POSITIONS WANTED

POSITION as claim agent wanted. Have had 20 years' experience as head of department with present company. Reason for desiring change want larger property and broader field. Can give best referenecs and can deliver the goods. Am 40 years of age and married. PW-429, Elec. Ry. Journal, Philadelphia.

## EXTRA WORK WANTED

**Appraisal and Rate Engineer**
Wants part time work. Central and Southern states. Complete reports; analyst. EW-432, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

## EMPLOYERS

Send us your inquiries for men of technical training and experience. We are obtaining employment for soldiers, sailors and marines released from the service.
Re-Employment Bureau of New York City for Soldiers, Sailors and Marines, 505 Pearl Street, north of Municipal Building, Professional Section, Worth 9250.

## We Have Work

### For Real Americans of Character and Ability

who wish to earn what they make. In other words, to be independent contractors. You furnish your labor for a predetermined price. You get paid all of the contract price when work is finished.

Men preferred who have the following experience in street car work: Electricians, interior woodworking assemblers.

For information write or communicate with the

**G. C. KUHLMAN CAR CO.**
**Cleveland ,Ohio**

WANTED

## OIL SALESMAN

A large corporation has need for an oil salesman to handle lubricating oils in the steam and electric railway trade.

He should be preferably a graduate engineer, who has had practical experience in locomotive and car shops, or at least has a good knowledge of shop conditions.

He must have had previous selling experience or be able to demonstrate sales ability. State qualifications in detail as to education and experience.

AS418-Electrical Railway Journal
935 Real Estate Trust Bldg., Phila., Pa.

## RAILS

15,000 TONS—NEW and RELAYERS
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.

**Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.**

**L. B. FOSTER COMPANY**
Park Building, Pittsburgh, Pa.

FOR SALE

## McKEEN MOTOR CAR

1—200 hp., in good condition, 84 seating capacity.

Price $9000 Cash or Part Approved Security. Address,

**Riviera Beach and Western**
Rivieria, Texas

FOR SALE

1—48-in. Niles Car Wheel

## BORING MACHINE

in good condition.

POYER
SUPPLY COMPANY
Distributors of MACHINERY and SUPPLIES
EQUIPMENT ENGINEERS
TERRE HAUTE, INDIANA, U.S.A.

## RAILS FOR SALE WIRE

*For Immediate Shipment*

## MATERIAL and EQUIPMENT

OF THE

**Friendly and Sistersville Railway Company**
**SISTERSVILLE, W. VA.**

This material is in excellent condition, consisting of 70-lb. A.S.C.E. Steel Rails, Ties, Steel Bridges, Copper Feed Wire, Copper Trolley Wire, I Beams, Bridge Timbers, Poles, Brackets, etc., etc.

Also offer New and Relaying Rails, any weight, located at our various yards.

**THE WILKOFF COMPANY**
FIRST NATIONAL BANK BLDG., PITTSBURGH, PA.
WOOLWORTH BLDG., NEW YORK CITY

## WORRYLESS ELECTRICAL REPAIRS

**On all kinds and sizes A.C. or D.C. motors and generators, starters, welders, controllers, or anything electrical. Quick shipment from stock material, of coils commutators—shafts—bearings, etc Remember our initials stand for our product.**

**CAREFUL CLEVELAND ACCURATE ARMATURE WORRYLESS WORKS, Inc.**

EST. 1895 4732-4-6 ST. CLAIR AVE., CLEVELAND INC. 1918

## "Opportunity" Advertising:

**Think *"SEARCHLIGHT"* First!**

0100

*Let the "Searchlight" Carry Your Message to*

## SOUTH AMERICA

and to the Spanish-speaking Engineers and Industrial Executives everywhere. Through the Searchlight Section of the new McGraw-Hill paper.

## INGENIERIA INTERNACIONAL

advertisers can now get in direct touch with Employment, Business and Professional Opportunities in

| | | |
|---|---|---|
| **South America** | **Cuba** | **Philippines and** |
| **Central America** | **Porto Rico** | **Spain** |

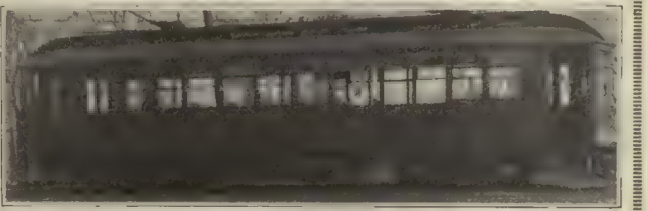
"Searchlight" advertisements will be printed in Spanish—same as the rest of the paper. No charge for translating copy.

***Get your copy in now for the next issue.***

ADVERTISING RATES:

UNDISPLAYED ADVERTISEMENTS, 5 cents a word—minimum charge $1.50 an issue. Discounts for consecutive insertions.

DISPLAYED at $5 or less per inch per insertion, depending on the number of inches used. 30 inches to a page.



FOR SALE

Two (2) Double

## TRUCK CARS

Length 44 ft. 6 in. Equipped with 4 G.E Co.'s 203 Motors and Air Brakes. Immediate Delivery.

**McGuire-Cummings Manufacturing Co.**
*Cars and Trucks—Snow Sweepers—Electric Locomotives*
111 West Monroe Street, Chicago

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A&B

## TURBINE

A&B

1—500-kw. Westg. Horizontal, 3-ph., 60 cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

## ROTARY CONVERTERS

1—500-kw. Westinghouse Rotary Converter, 6-ph., 600-v. D.C., 430-v. A.C., 600 r.p.m.
1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—200-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

**ARCHER & BALDWIN, INC.**
114-118 Liberty St., New York, N. Y.
*Telephone* 4337-4338 *Rector*

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SEARCHLIGHT
SERVICE
SECURES
SATISFACTORY
SITUATIONS
SALES

816

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## ROTARY CONVERTERS

### 60 CYCLE

3—500 KW. Westg., 6 phase, 60 cycle, commutating pole, 250 volts D.C., 2000 amps. D.C., 177 volts A.C., 6 pole, 1200 RPM. With each rotary are three 183 Kva. Westg. type, SKR, single phase, OI SC transformers, 6900 volts delta high tension. 15% inherent reactance also A.C. and D.C. panels, complete with necessary instruments.

THE ABOVE UNITS ARE ABSOLUTELY NEW.

1—400 KW. Gen. Elec., type HC, form P, 6 ph., 60 cy., 8 pole, 600 volts D.C., 667 amps. D.C., 430 volts A.C., 900 RPM., with switchboard and necessary instruments.

1—150 KW. Westg., 6 ph., 60 cy., 250 volts D.C., 600 amps, D.C., 177 volts A.C., 6 pole commutating pole, 1200 RPM. Transformer; 165 Kva. West., 3 ph., 6900 volts prim., OI SC, 15% inherent reactance; also A.C. and D.C. panels with necessary instruments.

THE ABOVE UNIT IS ABSOLUTELY NEW.

*We have these units in stock for immediate shipment. We own them and are not acting as brokers.*

**MACGOVERN & COMPANY, Inc.**
114 Liberty Street, New York, N. Y.
Pittsburgh Office, 498 Union Arcade Building

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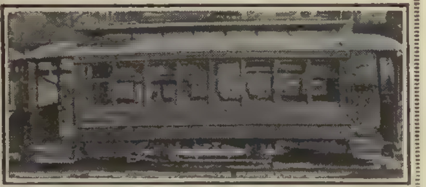
FOR SALE



4-32 ft. semi-convertible American Car Co.'s cars, Brill 21-E single truck, seating capacity 32, G.E. type 78, 35 H.P. motors, G.E. form K-10 controllers.

2-25 ft. trailers, single truck, seating capacity 50. For further particulars wire or write

**Goldstein Hide & Fur Co., Yazoo City, Miss.**

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## CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.

*Get our List and Prices.*

J. F. DONAHOO CO., Birmingham, Ala.

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FOR SALE

## 4 Wason Paye Cars

28 ft. over corner posts
Standard 0-36 Trucks
2 Gen. Elec. No. 87—60 hp.
Motors K-36 Control

*Splendid Condition*

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

---

FOR SALE

## GENERATING UNIT

1—425-Kw. G. E. Continuous Current Generator, Type M.P., 80 R.P.M., 500-550 volts, 773 amperes, full load, direct-connected to Hamilton-Corliss Engine, cylinder 28 in. x 48 in., S.P. 100 pounds, floor space 29 ft. x 7 ft. 6 in.

*Price on application.*

ELECTRICAL CONSTRUCTION CO.
2035 Washington Ave., Philadelphia, Pa.

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FOR SALE

Four Interurban

## Passenger Cars

And Two Interurban

## Freight Cars

Amer. Car Co., Builders, Age of Equipment, six years, Length over all 51 ft. 8 in., width extreme 8 ft. 3½ in., Seating Capacity 52, Height over trolley board 12 ft. 10 in., Rattan Seats, Newly painted, A1 condition.

### Trucks

27 M. C. B. No. 1 high-speed trucks, 4¼ x 8-ft. Journal, Wheel Base 6 ft. 6 in., 27-ft. Truck centers, 34-in. Steel Wheel, 3½ Tread, ⅞ flange, 6-in. Motor bearing axle, 7-in. Gear Seat axle, 4-ft. 8½-in. Gauge.

### Electrical Equipment

4 G. E. 205B (90) H.P. 600/1200 motors, 51/23 hardened gearing, 1 K. 47A Controller, 1 Set R. G. Rheostats, 1 G. E. CP29 A 25-ft. air Compressor.

**Motors, Rheostats, Trolleys and Headlights are suitable for use on straight 600 volts roads.**

**Will sell Car Body and Trucks complete, less Equipment, or will sell Equipment complete less Car Body and Trucks.**

UNION TRACTION CO.
Nashville, Tenn.

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*Get your Wants into the Searchlight*

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# WHAT AND WHERE TO BUY

## Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Rectifiers**
Holden & White, Inc.

**Ammeters**
Weston Elec'l Instrument Co.

**Anchors, Guy**
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Anti-Climbers**
Railway Improvement Co.

**Ash Storage Tanks, Cast Iron**
Green Engineering Company

**Automobiles and Buses**
Brill Co., The J. G.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

**Babbitt Metal**
Ajax Metal Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Batteries, Dry**
Johns-Manville Co., H. W.

**Batteries, Storage**
Electric Storage Battery Co.

**Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
Holden & White, Inc.

**Bearings, Roller and Ball**
Gurney Ballbearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

**Boiler Cleaning Compounds**
Johns-Manville Co., H. W.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Boiler Coverings**
Johns-Manville Co., H. W.

**Bond Testers**
American Steel & Wire Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Book Publishers**
McGraw-Hill Book Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

**Brake Adjusters**
Holden & White, Inc.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

**Brazing and Welding Processes**
Lincoln Bonding Co.

**Bricks, Fire**
Green Engineering Co.

**Bridges and Buildings**
American Bridge Co.

**Brooms, Track, Steel or Rattan**
Zelnicker, Walter A., Supply Co., Inc.

**Brushes, Carbon**
General Electric Co.
Jeandron W. J.
Morgan Crucible Co.
National Carbon Co., Inc.
United States Graphite Co.
Westinghouse Elec. & M. Co.

**Brushes, Graphite**
United States Graphite Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Buckets**
Blaw-Knox Company

**Bunkers, Coal**
American Bridge Co.

**Bushings, Case Hardened & Manganese**
Bemis Car Truck Co.

**Cables. (See Wires and Cables.)**

**Carbon Brushes. (See Brushes, Carbon.)**

**Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.**

**Car Trimmings. (For Curtains, Registers, Doors, Seats, etc.—See those headings.)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper**
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
American Malleable Castings Assn.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Electric Service Supplies Co.
Holden & White, Inc.
Kerschner Co., Inc., W. R.
Ohio Brass Co.
Wood Co., Chas. N.

**Change Carriers**
McGill Ticket Punch Co.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms.)**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn & Dutton Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery.)**

**Coasting Recorders**
Railway Improvement Co.

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Rome Wire Co
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Wood Co., Chas. N.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

**Concrete Mixers**
Blaw-Knox Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conduits, Underground**
Johns-Manville Co., H. W.

**Connectors, Solderless**
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
Eureka Co.
Trigger Lock Reversible Controller Finger

**Controllers or Parts**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conveyors Belt**
Portable Machinery Co.

**Conveyors, Coal & Ash**
Green Eng. Co.
Portable Machinery Co.

**Conveyors, Portable**
Portable Machinery Co.

**Conveying and Hoisting Machinery**
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Samson Cordage Works.

**Cord Connectors and Couplers**
Samson Cordage Works.
Electric Service Supplies Co.
Wood Co., Chas. N.

**Couplers, Car**
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Toledo Bridge & Crane Co., The
Van Dorn & Dutton Co.

**Creosoting. (See Wood Preservatives.)**

**Cross Arms. (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Armco Iron Culvert & Flume Mfrs. Assn.
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutting Apparatus, Oxy-Acetylene**
Milburn Co., The Alex.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.,
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Works)**
Cleveland Frog & Crossing Co.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Model 341**
**A. C. and D. C. Voltmeter**

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Polyphase Wattmeter, and Model 370 A.C. and D.C. Ammeter.

The characteristics of the group are extreme accuracy (guaranteed within one-fourth of 1% of full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand-calibrated scales.

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To be universally acknowledged throughout the world as the leader in a field in which there is opportunity for so much variation in quality as in electrical measuring instruments, and to hold that lead practically from the beginning of the industry to the present day, is an acknowledgement of supremacy beyond all question or dispute.

## Weston
Electrical
## Indicating Instruments

are today the standard of the world. The original instruments invented by Dr. Edward Weston established the science of electrical measurement as it is known and practiced today, and practically every advance in the science has emanated from this Company.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A.C. or D.C. Circuits; Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

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# Enamel Magnet Wire

TO those interested in Enamel Magnet Wire we beg to announce our new line of Enamel Magnet Wire, either plain, or with silk or cotton covering.

We invite correspondence, and will send samples and prices on request.

**Independent Lamp & Wire Co., Inc.**
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## Get those coils back into service—quick!

**Don't let LABOR SHORTAGE hold them up in your coil department. You can't get more men—but you can save time and money by sending the coils to us for re-insulation with**

## SALAMANDER Pure Asbestos

We will return them promptly—better insulated and more durable than when new.

"Salamander" asbestos wire excels in insulating value and cannot burn out under the severest overload.

Leading electric railways are our best customers.

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**OFFICES:** 1737 Broadway, New York
**FACTORIES:** York, Pa., and Weehawken, N. J.

# WHAT AND WHERE TO BUY

**Dogs, Lathe**
Williams & Co., J. H.

**Doors, Asbestos**
Johns-Manville Co., H. W.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Corp.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Archbold-Brady Co.
Arnold Co., The
Clark Management Corp., H. W.
Ford Bacon & Davis
Holst, Englehardt W.
Republic Engineers, Inc.
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Scofield Engineering Co.
Stone & Webster
Wells, Gardner F.
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

**Engines, Gas and Oil**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Engines, Steam**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Fabricated Steel**
Blaw-Knox Co.

**Fare Boxes**
Brill Co., The J. G.
International Register Co., The
Johnson Fare Box Co.
National Railway Appliance Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.
Page Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Electric Service Supplies Co.
Star Brass Works.

**Fibre and Fibre Tubing**
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

**Field Coils. (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Fire Extinguishing Apparatus**
Johns-Manville Co., H. W.

**Fire Proofing Materials**
Johns-Manville Co., H. W.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.
Johns-Manville Co., H. W.

**Forgings**
Carnegie Steel Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Furnaces. (See Stokers)**

**Fuses and Fuse Boxes**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.

**Fuses, Refillable**
Columbia M. W. & M. I. Co.
General Electric Co.

**Gaskets**
Johns-Manville Co., H. W.
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Carnegie Steel Co.
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Thayer & Co., Inc.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Kerschner Co., Inc., W. R.
National Railway Appliance Co.
Nuttall Co., R. D.
Van Dorn & Dutton Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs. (See Bells and Gongs)**

**Graphite**
Morgan Crucible Co.

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.
Indianapolis Frog & Switch Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Cattle**
American Bridge Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Harps, Trolley**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Holden & White, Inc.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The
Van Dorn & Dutton Co.

**Hose, Bridges**
Ohio Brass Co.

**Hose, Pneumatic and Fire**
Johns-Manville Co., H. W.
Westinghouse Traction Brake Co.

**Hydraulic Machinery**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Inspection**
Electrical Testing Lab's.

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Johns-Manville Co., H. W.
Standard Woven Fabric Co.
U. S. Rubber Co.
Westinghouse Elec. & Mfg. Co.

**Insulation. (See also Paints)**
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
Freyberg Bros., Inc.
General Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
U. S. Rubber Co.
Westinghouse Elec. & Mfg. Co.

**Insulators. (See also Line Material)**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Locke Insulator Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks. (See also Cranes, Hoists and Lifts)**
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Lackawanna Steel Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

**Joints, Rail**
Carnegie Steel Co.
Lackawanna Steel Co.
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., J. G.

**Junction Boxes**
Johns-Manville Co., H. W.

**Laboratory**
Electrical Testing Lab's.

**Lamp Guards and Fixtures**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent. (See also Headlights)**
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Ohio Brass Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lighting Regulators, Car**
Holden & White, Inc.

**Lights, Portable Carbide**
Milburn Co., The Alex.

**Lightning Protection**
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
Locke Insulator Co.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Locomotives, Electric**
Brill Co., The J. G.
General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**
Columbia M. W. & M. I. Co.

**Machine Work**
Columbia M. W. & M. I. Co.
Holden & White, Inc.

**Mats**
Johns-Manville Co., H. W.

**Meters, Car, Watt-Hour**
Economy Electric Devices Co.

**Meters (See Instruments)**
Electric Service Supplies Co.
Wood Co., Chas. N.

**Mirrors for Motormen**
Drew Elec. & Mfg. Co.

**Motors, Electric**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Nuts and Bolts**
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

**Ohmmeters**
Weston Elec'l Instrument Co.

**Oils. (See Lubricants)**

**Oil Storage Systems**
Gilbert & Barker Mfg. Co.

**Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)**

**Packing**
Johns-Manville Co., H. W.
Power Specialty Co.
U. S. Rubber Co.
Westinghouse Traction Brake Co.

**Packing Rings**
Johns-Manville Co., H. W.

**Paints and Varnishes, (Insulating)**
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.

**Paints and Varnishes for Woodwork**
National Ry. Appliance Co.

**Paints and Varnishes (Preservative)**
Johns-Manville Co., H. W.

**Paving Bricks, Filler and Stretcher**
Nelsonville Brick Co.

**Paving Material**
Am. Brake Shoe & Fdy. Co.
Barrett Co., The
Nelsonville Brick Co.

**Paving Pitch**
Barrett Co., The

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Pipe**
National Tube Co.

**Pipe Fittings**
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

**Planers. (See Machine Tools)**

**Pliers, Insulated**
Electric Service Supplies Co.

**Pole Reinforcing**
Hubbard & Co.

**Pole Sleeves**
Drew Elec. & Mfg. Co.

**Poles, Concrete**
Massey Concrete Products Co.

**Poles and Ties, Treated**
Lindsley Bros. Co.
Page & Hill Co.

**Poles Metal Street**
Bates Expanded Steel Truss Co.
Hubbard & Co.

**Poles Ties Posts Piling and Lumber**
Carney & Co. B. J.
Lindsley Bros. Co.
Page & Hill Co.
Southern Cypress Mfrs. Assn.
White Marble Lime Co.

**Poles Trolley**
Columbia M. W. & M. I. Co
Electric Service Supplies Co
National Tube Co.
Nuttall Co., R. D.

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National Tube Co.

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SAVE TIME
SAVE MONEY

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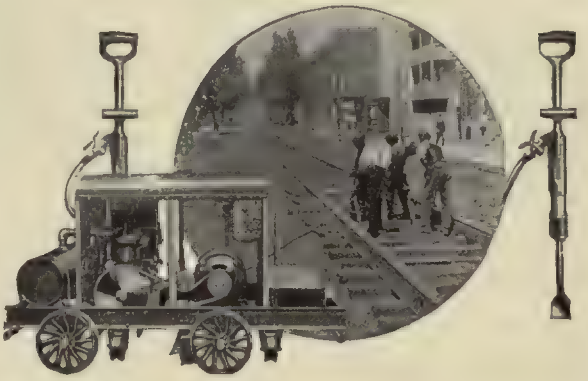
TIE TAMPING
OUTFITS



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***Bulletin 9123***

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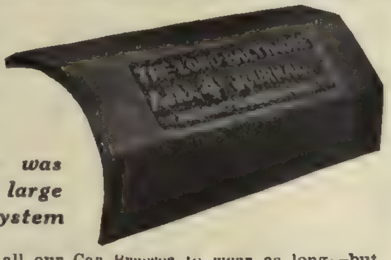

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Ajax Car Brasses, Check Plates and Babbitt Metals help to increase your dividends.
They are metals that give good service.

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**Carnegie Rolled Steel Gear Blanks**

Wear-resisting gears insure a continuous maximum production. They are lighter and wear three to seven times as long as cast steel gears.

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National Railway Appliance Co., Washington, D. C.

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**Selling Agents for Tool Steel Gears and Pinions. Johnson Fare Boxes. Perry Side Bearings. Hartman Centering Center Plates. Vulcan One-Man Kerosene Furnace. Garland Ventilators. Electric Arc Welders. High Class Railway Varnishes and Enamels.**

Special Agents for Tool Steel Gear & Pinion Co., Johnson Fare Box Co, C. & C. Electric & Mfg. Co., Holden & White, Inc. General Agents for Anglo-American Varnish Co. Eastern Agents for Union Fibre Co. Economy Power Saving Meters.

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**Power Saving Devices**
- Arthur Power-Saving Recording Co.
- Economy Electric Devices Co.
- Railway Improvement Co.

**Pressure Regulators**
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Products, Concrete**
- Massey Concrete Products Co.

**Pumps**
- Allis-Chalmers Mfg. Co.

**Protection, Industrial**
- Industrial Protective Co.

**Punches, Ticket**
- Bonney-Vehslage Tool Co.
- International Register Co., The
- McGill Ticket Punch Co.
- Wood Co., Chas. N.

**Purifiers, Feed Water**
- Scaife & Sons Co., Wm. B.

**Rail Grinders. (See Grinders)**

**Railway Safety Switches**
- Westinghouse Elec. & Mfg. Co.

**Rail Welding. (See Brazing and Welding Processes)**

**Rails, New**
- Cambria Steel Co.
- Midvale Steel & Ordnance Co.

**Rails, Steel**
- Carnegie Steel Co.

**Rails, Relaying**
- Zelnicker, Walter A., Supply Co., Inc.

**Rattan**
- Brill Co. The J. G.
- Electric Service Supplies Co.
- Hale & Kilburn Corp.
- McGuire-Cummings Mfg. Co.
- St. Louis Car Co.

**Recorders, Power Saving**
- Arthur Power-Saving Recorder Co.

**Registers and Fittings**
- Brill Co., The J. G.
- Electric Service Supplies Co.
- Exell Mfg. Co., The
- International Register Co., The
- Rooke Automatic Register Co.

**Reinforcement, Concrete**
- American Steel & Wire Co.
- Carnegie Steel Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines)**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Repair Work. (See also Coils)**
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Independent Lamp & Wire Co.
- Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Resistance, Grid**
- Columbia M. W. & M. I. Co.
- Ellcon Co., The

**Resistance, Wire and Tube**
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley. (See Catchers and Retrievers, Trolley)**

**Rheostats**
- Ellcon Co., The
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Roofing, Building**
- Barrett Co., The
- Johns-Manville Co., H. W.

**Roofing, Car**
- Johns-Manville Co., H. W.

**Rubber Specialties of All Kinds**
- U. S. Rubber Co.

**Sanders, Track**
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Holden & White, Inc.
- Ohio Brass Co.
- St. Louis Car Co.

**Sash Fixtures, Car**
- Brill Co., The J. G.

**Sash Metal, Car Window**
- Hale & Kilburn Corp.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**

**Seats Car. (See also Rattan)**
- Brill Co. The J. G.
- Hale & Kilburn Corp.
- St. Louis Car Co.

**Second-Hand Equipment**
- Archer & Balwin
- Cleveland Armature Wks.
- Duquense Elec. & Mfg. Co.
- Electric Equipment Co.
- Exell Mfg. Co., The
- Foster Co., L. B.
- Griswold Machine Co., G. M.
- Hyman Michaels Co.
- MacGovern & Co., Inc.
- Zelnicker Supply Co., Inc., Walter A.

**Shovels**
- Hubbard & Co.

**Shovels, Power**
- Allis-Chalmers Mfg. Co.
- Brill Co., The J. G.

**Signals, Car Starting**
- Consolidated Car Heating Co.
- Electric Service Supplies Co.
- National Pneumatic Co., Inc.

**Signal Systems, Block**
- Electric Service Supplies Co.
- Federal Signal Co.
- U. S. Electric Signal Co.
- Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
- U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
- Carnegie Steel Co.

**Sleet Wheels and Cutters**
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Drew Electric & Mfg. Co.
- Holden & White, Inc.
- More-Jones Brass & Metal Co.
- Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- McGuire-Cummings Mfg. Co.

**Soldering and Brazing Apparatus (See Welding Processes and Apparatus)**

**Speed Indicators**
- Johns-Manville Co., H. W.

**Spikes**
- American Steel & Wire Co.
- Lackawanna Steel Co.

**Splicing Compounds**
- Johns-Manville Co., H. W.
- Standard Woven Fabric Co.
- U. S. Rubber Co.
- Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves. (See Clamps and Connectors)**

**Springs, Car and Truck**
- American Steel Foundries
- American Steel & Wire Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Standard Steel Works Co.

**Sprinklers, Track and Road**
- Brill Co., The J. G.
- McGuire-Cummings Mfg. Co.
- St. Louis Car Co.

**Steel Forms**
- Blaw-Knox Co.

**Steps, Car**
- American Mason Safety Tread Co.
- Universal Safety Tread Co.

**Stokers, Mechanical**
- Babcock & Wilcox Co.
- Green Engrg. Co.
- Westinghouse Elec. & Mfg. Co.

**Storage Batteries. (See Batteries, Storage)**

**Strand**
- Roebling's Sons Co., J. A.

**Straps, Car, Sanitary**
- Holden & White, Inc.
- Railway Improvement Co.

**Structural Iron.. (See Bridges)**

**Superheaters**
- Babcock & Wilcox Co.
- Locomotive Superheater Co.
- Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)**

**Switch Stands**
- Indianapolis Switch & Frog Co.
- Ramapo Iron Works

**Switches, Lock**
- Weiss Switch Lock Co.

**Switches, Track. (See Track Special Work)**

**Switches and Switchboards**
- Allis-Chalmers Mfg. Co.
- Anderson Mfg. Co., A. & J. M.
- Electric Service Supplies Co.
- General Electric Co.
- Nichols-Lintern Co.
- Westinghouse Elec. & Mfg. Co.

**Synchroscopes**
- Weston Elec'l Instrument Co.

**Tampers, Tie**
- Ingersoll-Rand Co.

**Tanks, Ash and Coal Storage**
- Green Engineering Co.

**Tanks, Oil Storage**
- Gilbert & Barker Mfg. Co.

**Tapes and Cloths. (See Insulating Cloth, Paper and Tape)**

**Telephones and Parts**
- Electric Service Supplies Co.

**Testing, Commercial and Electrical**
- Elec'l Testing Laboratories

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
- Consolidated Car Heating Co.
- Gold Car Heating & Lighting Co.
- Holden & White Inc.
- Railway Utility Co.
- Smith Heater Co., Peter

**Thread-Cutting Tools**
- Williams & Co., J. H.

**Ticket Choppers and Destroyers**
- Electric Service Supplies Co.

**Ties, Mechanical**
- Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**
- American Bridge Co.
- Barbour-Stockwell Co.
- Carnegie Steel Co.
- International Steel Tie Co.

**Tie Plates**
- Cambria Steel Co.
- Midvale Steel & Ordnance Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tool Holders**
- Williams & Co., J. H.

**Tool Steel**
- Carnegie Steel Co.

**Tools, Track and Miscellaneous**
- American Steel & Wire Co.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Hubbard & Co.
- Johns-Manville Co., H. W.
- Railway Track-work Co.

**Torches, Acetylene. (See Cutting Apparatus)**

**Towers and Transmission Structures**
- American Bridge Co.
- Archbold-Brady Co.
- Bates Expanded Steel Truss Co.
- Blaw-Knox Co.
- Westinghouse Elec. & Mfg. Co.

**Track, Special Work**
- Barbour-Stockwell Co.
- Cleveland Frog & Crossing Co.
- Columbia M. W. & M. I. Co.
- Indianapolis Switch & Frog Co.
- New York Switch & Crossing Co.
- Ramapo Iron Works
- St. Louis Frog & Switch Co.

**Transfer Tables**
- American Bridge Co.

**Transfers. (See Tickets)**
- Archbold-Brady Co.

**Transformers**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stair, Car Step**
- American Mason Safety Tread Co.
- Universal Safety Tread Co.

**Trolley Bases**
- Anderson Mfg. Co., A. & J. M.
- Electric Service Supplies Co.
- General Electric Co.
- Holden & White, Inc.
- More-Jones Brass & Metal Co.
- National Railway Appliance Co.
- Nuttall Co., R. D.
- Ohio Brass Co.

**Trolley Bases, Retrieving**
- Holden & White, Inc.

**Trolleys and Trolley Systems**
- Ford Chain Block & Mfg. Co.

**Trolley Shoes**
- Holden & White, Inc.

**Trolley Wheels. (See Wheels, Trolley)**

**Trolley Wire**
- American Steel & Wire Co.
- Roebling's Sons Co., John A.
- Rome Wire Co.

**Trucks, Car**
- American Steel Foundries
- Bemis Car Truck Co.
- Brill Co., The J. G.
- McGuire-Cummings Mfg. Co.
- St. Louis Car Co.

**Tubing, Steel**
- National Tube Co.

**Turbines, Steam**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Terry Steam Turbine Co.
- Westinghouse Elec. & Mfg. Co.

**Turbines, Water**
- Allis-Chalmers Mfg. Co.

**Turnstiles**
- Perey Mfg. Co., Inc.

**Vacuum Impregnation**
- Allis-Chalmers Mfg. Co.

**Valves**
- Ohio Brass Co.
- Westinghouse Traction Brake Co.

**Varnishes. (See Paints, etc.)**

**Ventilators, Car**
- Brill Co., The J. G.
- Holden & White, Inc.
- National Railway Appliance Co.
- Railway Utility Co.
- St. Louis Car Co.

**Vises, Pipe**
- Williams & Co., J. H.

**Voltmeters. (See Instruments)**

**Water Softening and Purifying Systems**
- Scaife & Sons Co., Wm. B.

**Wattmeters**
- Weston Elec'l Instrument Co.

**Welded Rail Joints**
- Indianapolis Switch & Frog Co.

**Welding Processes and Apparatus**
- Electric Railway Improvement Co.
- General Electric Co.
- Indianapolis Switch & Frog Co.
- Metal & Thermit Corp.
- National Ry. Appliance Co.
- Westinghouse Elec. & Mfg. Co.

**Welders, Portable Electric**
- Electric Railway Improvement Co.
- Indianapolis Frog & Switch Co.

**Wheel Guards. (See Fenders and Wheel Guards)**

**Wheel Presses. (See Machine Tools)**

**Wheels, Car, Cast Iron**
- Bemis Car Track Co.

**Wheels, Car, Steel and Steel Tired**
- American Steel Foundries
- Bemis Car Truck Co.
- Carnegie Steel Co.
- Standard Steel Works Co.

**Wheels, Trolley**
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Eureka Co.
- General Electric Co.
- Johns-Manville Co., H. W.
- More-Jones B. & M. Co.
- Nuttall Co., R. D.
- Star Brass Works

**Whistles, Air**
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Traction Brake Co.

**Wire Rope**
- American Steel & Wire Co.
- Roebling's Sons Co., John A.

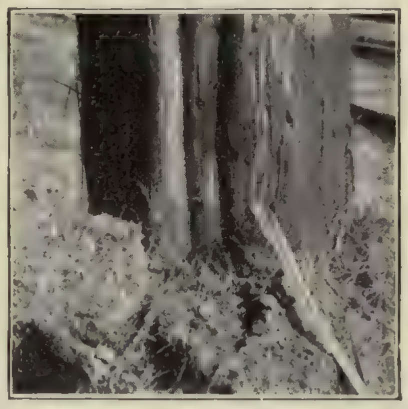
**Wires and Cables**
- Aluminum Co. of America
- American Elec'l Works
- American Steel & Wire Co.
- Bridgeport Brass Co.
- D & W Fuse Co.
- General Electric Co.
- Roebling's Sons Co., John A.
- Rome Wire Co.
- Westinghouse Elec. & Mfg. Co.

**Wrenches**
- Williams & Co., J. H.

**Wood Preservatives**
- Lindsley Bros. Co.

**Woodworking Machinery**
- Allis-Chalmers Mfg. Co.

*Shaving a 6 in.-30 ft. cedar pole preparatory to treatment with Carbosota.*



*This pole was not properly cleaned before treating. Note how bark is peeling and exposing inner wood.*

*Brush-treating pole. Note use of a mop, which is more satisfactory than a brush.*

# Careful Treatment Insures Results—

BRUSH treatments are efficient in retarding decay of poles, and result in an average saving of approximately 15% in the annual cost, when carefully applied and strictly in accordance with specifications.

The pole shown in the center illustration was not properly *"cleaned of all adhering inner bark and other foreign substances."* For that reason, after a brief period of service the inner bark loosened and is peeling off. The result is a break in the film of creosote, exposing untreated wood and eventually causing the failure of the treatment.

Carbosota Creosote Oil is the standard preservative for Brush Treatment and the Open Tank Process. It is 100% efficient—absolutely uniform and conforms to United States Shipping Board Emergency Fleet Corporation Specification No. 128, for refined coal-tar creosote oil. There is no better preservative than Barrett's Carbosota.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases, and treatment modified accordingly.)

Barrett TRADE B MARK

**Carbosota**

**Grade-One Liquid**

**Creosote Oil**

Recommendations for creosoting poles and other information desired may be obtained gratis by addressing nearest office.

**The Barrett Company**

New York
Chicago
Philadelphia
Boston
St. Louis
Cleveland
Cincinnati
Pittsburgh
Detroit
Birmingham
Dallas
New Orleans
Kansas City
Minneapolis
Salt Lake City
Nashville
Seattle
Peoria
Atlanta
Duluth
Milwaukee
Bangor
Washington
Johnstown
Lebanon
Youngstown
Toledo
Columbus
Richmond
Latrobe
Bethlehem
Elizabeth
Buffalo
Baltimore

THE BARRETT COMPANY, Limited:
Montreal
Toronto
Winnipeg
Vancouver
St. John, N. B.
Halifax, N. S.
Sydney, N. S.

*Spraying Carbosota on poles instead of painting or mopping.*

*Modern open tank process commercial pole treating plant. Western Wood Preservers, Sandpoint, Idaho. (W. C. Assoc.)*

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Economy and Efficiency

Triggerlock Reversible Controller Fingers are equipped with a replaceable extruded copper tip which is of extra long life, and since this tip can be easily reversed for re-use the ECONOMY is still greater.

*There are other advantages you should know about. Write.*

200 railways use them as standard. **Write for booklet** or order some. We make all types.

**TRIGGERLOCK REVERSIBLE CONTROLLER FINGER**
**810-8 Bath Ave., Niagara Falls, N. Y.**
Z. L. K.—10 **557 King St. West, Toronto, Canada**

UNIVERSAL ANTI-SLIP TREADS
cars and station steps.
**Universal Safety Tread Company**
**Waltham, Mass.**

The "Hycap-Exide" Battery
for
STORAGE BATTERY STREET CARS
THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

SAMSON SPOT WATERPROOFED TROLLEY CORD

Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.
**SAMSON CORDAGE WORKS, BOSTON, MASS.**

**MASON SAFETY TREAD**—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits
**KARBOLITH CAR FLOORING**—For steel cars; is sanitary, light weight, fire proof, non-slippery.
**STANWOOD STEPS**—Self-cleaning, non-slippery, light.
Over six million feet used without accident being reported within the knowledge of manufacturer.
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**AMERICAN MASON SAFETY TREAD CO., Lowell, Mass.**
Branch Offices: Boston, New York City, Philadelphia.
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# These Columbia Tools

## can turn out Bearings for you at once

YOU will understand the perfection of Columbia-made products when we tell you that we have several hundred machine tools alone.

Practically each tool, be it drill, shaper, borer, grinder, planer or lathe, is handled by the same man day in, day out.

Such specification inevitably results in turning out the best possible work.

That's only one of the many reasons for using Columbia-made products.

# Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St.
**Brooklyn, N. Y.**

W. R. Kerschner Co., Inc., N. Y.
Holden & White, Inc., Chicago
F. F. Bodler, San Francisco
Railway & Power Eng. Co., Ltd., Toronto, Ont.

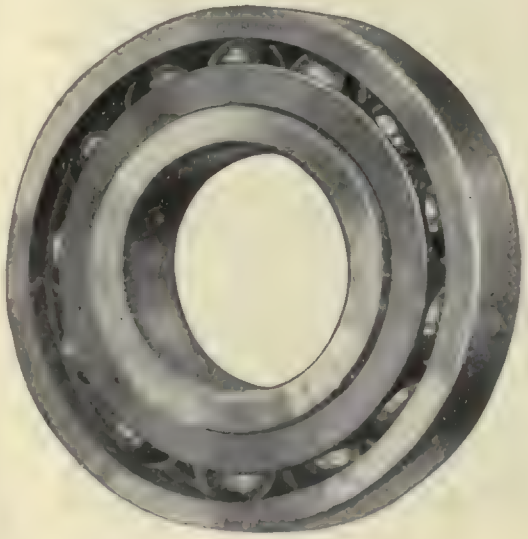
**TOOLS**

- Armature and Axle Straighteners
- Armature shaft straighteners
- Armature buggies and stands
- Babbitting molds
- Banding and heading machines
- Car hoists
- Car replacers
- Coil taping machines for armature leads
- Coil winding machines
- Pinion pullers
- Pit jacks
- Signal or target switches
- Tension stands

**CAR EQUIPMENT**

- Armature and axle bearings
- Armature and field coils
- Bearings (axle and armature)
- Brush-holders and brush-holder springs
- Brake, door and other handles
- Brake forgings, riggings, etc.
- Car trimmings
- Commutators
- Controller handles
- Forgings of all kinds
- Gear cases (steel or malleable iron)
- Grid resistors
- Third-rail shoe beams and accessories
- Trolley poles (steel) and wheels

# Pioneering



When you buy Gurney Ball Bearings you get, not an experiment, but a product of proven worth.

Back of the name GURNEY are fourteen years of study, experiment, tryout, of patient and intelligent development of design, material, and processes.

When you submit your bearing problems to the Gurney Service Engineering Department, you reap the reward of our pioneering. You get a finished product of KNOWN capacity, efficiency, and durability.

F. W. Gurney.

## GURNEY BALL BEARING CO.

JAMESTOWN, N. Y.

**GURNEY**

358

"Good work my boy! You're a safer driver than I am. My hat's off to you for saving us from a smash up."

"Lucky for you, sir, that this is a Birney Safety Car. No other car could have made that quick stop."

THE quick stop of the Birney Safety Car cannot always prevent a smash-up, but it does reduce the number of such accidents to the lowest point that human ingenuity has been able to attain and beyond which it hardly can expect to go.

With the enormously increasing use of automobiles and the corresponding increase in the number of collisions with street cars, the railway companies need protection from culpability for themselves and their employes.

No case of negligence, to provide the utmost safety to street vehicles and pedestrians can be made against a company whose lines are equipped with Birney Safety Cars.

Modern street conditions demand a modern street car—one that can make good running time and make it safely.

The short, light-weight car, equipped with a complete outfit of interlocking emergency-stop features, is a positive necessity of the times.

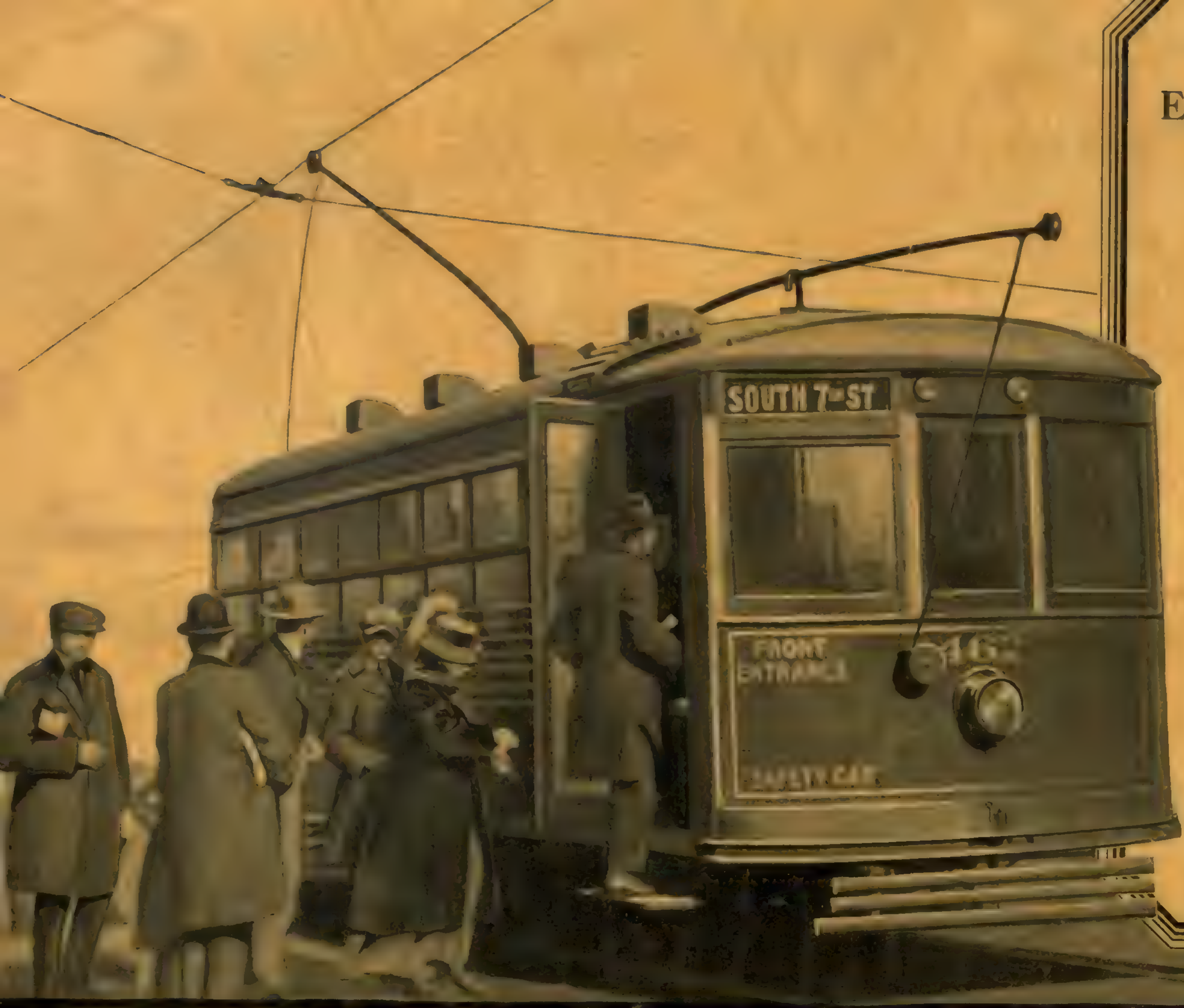
The experience of the companies that are operating Birney Safety Cars proves that in quick acceleration, normal braking and emergency braking, these cars are better than automobiles. Therefore they are safe and suitable for crowded streets.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR COMPANY
ST. LOUIS, MO.
G.C.KUHLMAN CAR COMPANY
CLEVELAND, OHIO
WASON MANUFACTURING CO.
SPRINGFIELD, MASS.

BIRNEY
TRADE MARK
SAFETY
CAR

*Merely lifting the hand from the controller handle is all that is needed to make an emergency stop—the power is cut off, the brakes applied, the track sanded and the doors unlatched.*

BRILL



## General Electric Equipped Safety Cars

The thirty safety cars on the lines of the Terre Haute Traction & Light Company are equipped with G. E. 258 motors, K control and C P 25 compressors.

The public has signified its appreciation of the improved service by material increase of patronage on lines where safety cars are run. In addition, a marked reduction in operating costs has been effected through the use of these cars.

# GENERAL ELECTRIC COMPANY

General Office, Schenectady, N.Y.
Sales Offices in all large cities

25-50

BOUND BY